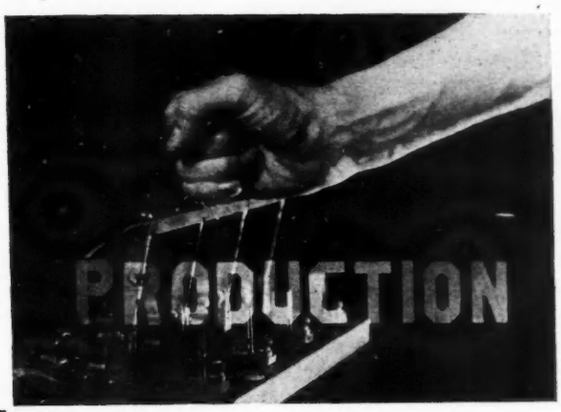
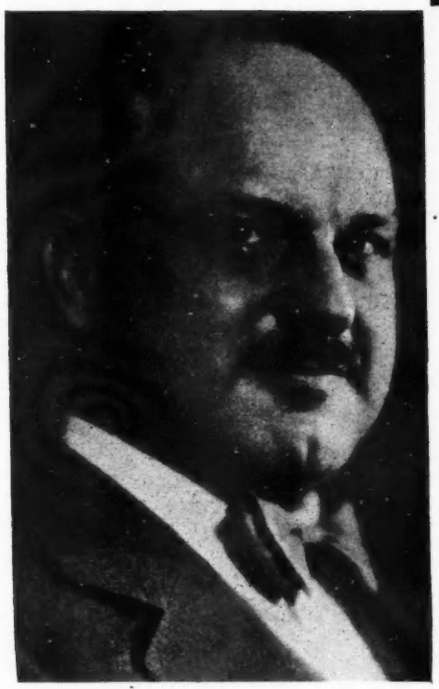
AUTOMOTIVE INDUSTRIES

OCTOBER 17, 1931
VOLUME 65
NUMBER 16





More Common Sense In Production Management Is the Order of the Day

H. S. Vance
Vice-Prest., in Charge of Manufacturing
Studebaker Corp. of America

IT is a commonplace that, whereas the first decade of the automobile business was an era of production, we are now in an era of sales. This idea springs from the simple fact that aggregate production facilities are greatly in excess of aggregate demand.

But, fundamentally, the product itself must be its best salesman, its best advertiser. While, on occasion, engineers may furnish stimulus in the form of mechanical novelty, they cannot be depended upon to do so regularly.

The public constantly becomes less responsive to exploitation and more influenced by real values. Values are expressed principally in price. There is a tendency to hide behind the theory that the automobile business is a proprietary business, where each product has individuality, making cost and price less important than they obviously are in other lines of manufacture. But, even if price is less important in making automobiles than in making steel, low cost may furnish the margin by which other factors, such as engineering, sales and advertising, can be financed.

Production management, therefore, has still to see its day of greatest importance.

Too much has been written, said and believed about the marvels of mass production in the automobile industry. True, this industry, in its comparatively short life, has done more than all others combined to speed up mechanical progress. The enabling factor has been its tremendous volume in pieces, in dollars. But this same factor of volume has created its own special problem.

Size, *per se*, does not mean low cost. With growth of the production unit come system and organization to take the place of personal supervision. When personal supervision is competent it is much the better of the two.

We might say that the production function in the automobile industry is now in its third phase. The first phase started at the beginning of the industry, when vehicle manufacturers were not well equipped financially and had to draw on specialty concerns for parts, even for such important units as power plants, transmissions and bodies. The second phase,

which started about 1915, was the direct result of large profits which these manufacturers made and retained for the purpose of expansion. In this second phase, the universal belief was that it was cheaper and better to make everything themselves.

The third phase of automobile production dates from about 1925. It is characterized by a reversal of the trend in the previous period; by restriction instead of expansion of production by the vehicle manufacturers, and a swing back to specialty concerns, whom we know as part suppliers.

There is food for thought in the reason why we have this third phase of production development.

Conditions Were Adjusted by Necessities

Necessity forced the parts maker to extreme measures as the price of his existence. By specialization and simplification of every phase of production he has put himself in a position where he can compete with the car manufacturer's own plant, and he has regained, in part at least, the business which he lost.

Of course, there are other reasons why parts makers have taken business out of the plants of car manufacturers. One of these is the patent situation, but upon analysis it will be found that patents are an unimportant factor in the parts makers' business as a whole. More important weapons in the hands of the parts maker are, first, his research development—which is confined to one or at least to a few products and, therefore, intensified—and, second, his ability to relieve the car manufacturer of a part of the burden which is placed more or less regularly on each organization through our system of model changes. These and other reasons play minor parts in this situation, but fundamentally it is cost, and only cost, which gives the parts maker his opportunity.

Several financial writers have predicted that the present business and industrial situation will mark the growth of a number of small businesses in a variety of industries. What these writers have in mind is that small organizations, free from the burdens of precedent, of policy, of system and complex organization, are more mobile and are more economical in operation than are some of their larger competitors.

In our industry the small concern can have no advantage in purchasing power which determines the cost of material. It should have no advantage in productive labor cost except as it may be in a less conspicuous position as an employer and therefore better able to adjust its cost of labor to conditions, particularly in an individual community outside of the large industrial areas. But this factor loses some of its force when one considers that there are many small concerns operating in larger industrial areas and doing so quite successfully.

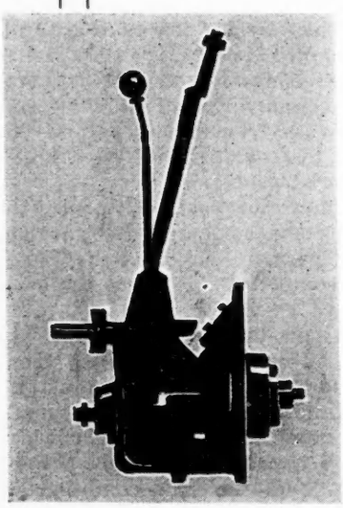
The natural and correct conclusion to which all of this leads us is that the cost advantage of the small concern must be principally in overhead expense.

The Impossible Has Become Possible

In most automobile plants average overhead amounts to from one and one-half to two times productive labor. Nothing more need be said to emphasize its importance. Nevertheless, the importance of overhead has not been recognized, except in a general way, until within the last two years, when the pressure of necessity has forced economies which previously would have been regarded as unattainable. In many organizations the depression has made the impossible possible. Organization charts have been scrapped, departments have been consolidated, men and groups of men thought to be vital to the business have been eliminated, systems and records have gone overboard. Whole organizations have undergone a vigorous diet and have found themselves better for it.

If it is true that the evolution of production management in this industry has passed through three phases, as suggested above, we might well say that we are now entering a fourth phase, which might well be called that of common sense in production management.

"Amidships"—



Thousands of cars have free wheeled into owners' hands on free wheeling since the first announcements over a year ago.

But there's more to come.

Transmission and clutch developments are destined to mark up new sales scores in the months ahead.

Our technical writers are following the work on the boards carefully. They will give you a series of the finest, provocative discussions of "amidships" you've ever read.

Athel F. Denham, for years Automotive Industries field editor in Detroit, writes on automatic transmissions for our next week's issue.

It's fine
—and more about "amidships" is on its way.

Replacement Fund and Depreciation Account Are Often Distantly Related

says Ernest F. DuBrul

Gen. Mgr., National Machine Tool Builders' Association.

EVERY sensible production man knows that to keep his costs in line with those of his competitors, he must keep his equipment about as up-to-date as that of his competitors. Every sensible business executive understands this general principle. But anyone making a round of visits to competitive shops is sure to find very many cases in which shop practices diverge very widely from the principle which both the production man and the business executive claim to believe in.

Ask the production man why this obsolete equipment is tolerated around the place and he is most likely to say, "The finance committee will not authorize the purchase of new equipment." Ask the financial controller why appropriations are not made for these needed purchases, and he will most likely reply, "We have not the cash available." This, too, in many cases where the company's operating statement has shown not only comfortable, but even large profits for years past. More strangely still, the same answer is given by financial controllers of companies who for years past have shown larger charges to that queer account they call "Reserve for Depreciation."

Delving deeper, one finds that "Depreciation" account really does not mean anything like its name implies; and that the controller really has no cash available to replace the out-of-date equipment which the production man has to tolerate and to struggle with, contrary to his best production judgment. The corresponding cash was mostly used for something else.

Still the production man is hounded to "reduce costs"; hounded by the very men who refuse to purchase equipment without which costs cannot be really reduced. In many cases this inefficiency of management is sought to be passed on to the workers operating these inefficient machines by a cut in their wages. But frequently wage cutting to "reduce costs" produces a very much smaller reduction of cost than could have been had by installing up-to-date equipment without cutting wages.

The "Depreciation" account has a lot to do with all this, simply because the general run of financial executives have an entirely wrong idea of what that account should represent. It is not many years since no such item as "Depreciation" showed up, even in the annual profit and loss statements of thousands of companies. When it did, it was charged to surplus, if there was a good sized figure on the surplus account. Even today interim profit reports of many prominent corporations naively report "Net Earnings—Before Depreciation." Such a report is clear evidence that the management, if honest, holds the belief that depreciation has little—if anything—to do with operations. More often than not, even today, a charge against "Depreciation" is looked on as some sort of a way by which the government foolishly permits the taxpayer to dodge income taxes on some of his profits.

It is surprising how many corporation managers fail to think of a depreciation charge as an operating cost. Even among those who do think of it in its true light, very few indeed set up a "Fund for Replacement of Plant" as they do a "Sinking Fund for Payment of Bonds." The "Replacement Fund" is even the more necessary of the two in most cases. If they set up such Replacement Funds, the financial controllers would have cash available for the production man to use in replacing out-of-date equipment whenever such replacement is needed.

(Turn to page 590, please)

The Use of Holding More

By John E. Wells
Ex-Cell-O Aircraft & Tool Corp., in Collaboration with Carboloy Co., Inc.

Equipment must be capable increased speed without vibration to use tungsten-carbide tools and hold close limits and quality of work

THE introduction of tungsten-carbide represents even a greater stride than did high-speed steel in the early days. Contrasting the gradual development of high-speed steel, which was over a period of years, the machine tool industry has been quite thoroughly educated in approximately three years, not only to the advantages of using tungsten-carbide but also to the technique that is required to get the most out of its use. Developments in the machine tool industry, due to this new cutting material, have been quite remarkable. New machine tools, especially designed to use tungsten-carbides, with greater power, higher speed and greater rigidity, have been announced by practically all the leading machine tool builders. At the present time several new machine tools are in the course of development and completion which were hardly considered possible or necessary three years ago.

In many cases it is not practical for the manufacturing public to replace their present equipment with machine tools more suitable for the economical performance of tungsten-carbide tools. Those who are confronted with this problem are using tungsten-carbide on their present equipment with results which far exceed previous performances. Although careful application and some revision of present equipment makes this possible, the results are not of the same high order as those obtained with modern machine tools particularly adapted to tungsten-carbide. In adapting their present equipment there are several problems that must be given careful consideration. Is the machine upon which these tools are to be used capable of the higher increased speeds and feed without vibration, at the same time giving increased production and maintaining the same close limits and quality of

Photo by Carboloy Co., Inc.

Fig. 1—Tungsten-carbide tools used for counterboring clutch facings + + + + + + + +

Tungsten-Carbide Tools Results in Uniform Limits on Machined Parts

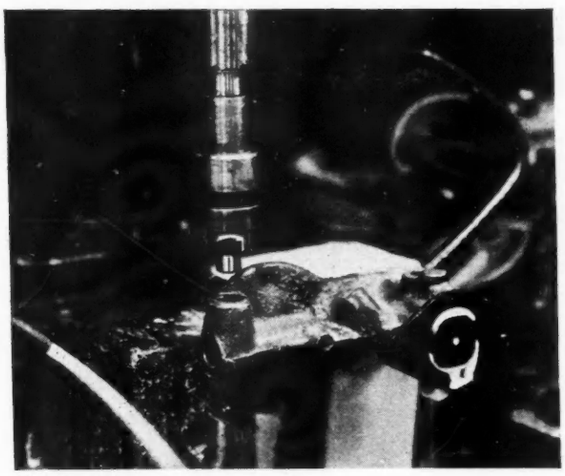


Photo by Carboloy Co., Inc.

Fig. 2—A tungsten-carbide spot-facing tool on a cast-iron carburetor cover

product? Tungsten-carbide cannot be considered a cure-all in the cutting tool field, but each and every application must be studied to insure proper tool design and correct operating conditions to obtain maximum results. The use of tungsten-carbide tools results in the holding of more uniform limits on the machined parts, thereby giving greater ease in assembly.

In order to better acquaint our readers with the strides that tungsten-carbide tools are making, a few applications have been selected from the automotive industry as the best illustration of what can be accomplished. In the majority of these cases comparative data is given between the former tools used and tungsten-carbide tools now in use.

Boring Cast-Iron Transmission Cases

Rough boring the main bearing hole in the cast-iron transmission case in the Chrysler-Newcastle plant presents an interesting study. With the use of standard cutting tools they were able to secure 100 to 125 pieces per grind. When tungsten-carbide was applied, the speed was increased from 36 r.p.m. to 48 r.p.m. on the boring bar, maintaining the same feed per revolution. This increased speed enabled them to obtain 950 to 1000 pieces per grind as compared to the 100 to 125 previously obtained, and the down time was reduced to a minimum, which in turn effected a saving in direct labor as well as an increase in production.

Rough and semi-finish facing of the bell housing end of the cast-iron transmission case represented another severe application. The flange of this case is very thin in sections and extremely hard, with a considerable number of chilled spots. With the best grade of tools formerly used 50 pieces per grind were obtained at a speed of 110 ft. per min., with a feed of .035 in. Applying tungsten-carbide at the same feed and depth of cut, increasing the speed to 168 ft. per min., 175 pieces were secured before grinding was necessary. In finish facing, 150 to 200 pieces per grind, with tools formerly used, were obtained, as compared with 700 to 900 pieces after adopting tungsten-carbide.

Machining Fly Wheels

In the Marmon Motor Car Co., Indianapolis, Ind., plant, the flywheels are machined, using an eight-tool set-up which required 15 min. to change, and the machine used would not permit greater speed or feed. By applying tungsten-carbide tools the operating machine hours were materially increased, due to longer tool life. With the cutting tools previously used 50 flywheels per grind was the best performance, but by replacing these tools with tungsten-carbide over 1100 flywheels were completed without an appreciative sign of wear of the tools. A surface speed of 130 ft. per min. was maintained with a feed of 1/32 in. per revolution. The production was materially increased, thus increasing the productive capacity of the machine. At the same time the tungsten-carbide tools gave a better finish and held size more accurately.

Boring Cast-Iron Shock-Absorber Bodies

On the boring of a cast-iron shock-absorber body of a large mid-western manufacturer, tungsten-carbide played an important part in speeding up production and reducing costs. Before tungsten-carbide tools were adopted they were averaging about 5 hr. per tool per grind, machining approximately 600 bodies. After adopting tungsten-carbide, the new tool ran 268 hr., producing a total of approximately 32,160 bodies. Based on these figures, 54 of the original tools would be required to do an equivalent job of one tungsten-carbide tool. From these figures can be easily calculated the saving by increased production and reduced down time on parts of this type.

Machining Aluminum Pistons

In the manufacture of aluminum pistons by the Ray Day Piston Co. of Detroit, tungsten-carbide tools have played an important part. These tools are used for grooving of the rings, facing, boring, chamfering the open end, and turning of the outside diameter of the piston. The grinding time has been reduced from three to four times a day on steel-cutting tools to once every two or three weeks on tungsten-carbide tools. The speeds used on their machines for the different operations are as follows: turning O.D., 425 ft. per min., an increase of 33 per cent; facing the dome and turning the skirt, 625 ft. per min., an increase of 66 per cent, and the grooving tools operating at 480 ft. per min., an increase of 50 per cent.

The work must be held to close tolerances, from 0.0005 in. to 0.001 in. The increased speeds, at the same time maintaining the high standard of quality together with the reduction in grinding time has more than justified the use of tungsten-carbide on the majority of operations on the production line of this company.

Machining Carburetor Bodies

Facing the tough surface skin or hard outer scale on close-grained iron castings presents difficulties when trying to machine on a production basis. In the plant of the Zenith Carburetor Co. of Detroit, an unusually hard casting is being reamed and spot faced (see Fig. 2). The spot facing of the cast-iron carburetor cover also shows an equally attractive increase, the speed maintained being 300 ft. per min., with a 3/16-in. cut for both the former tools and the tungsten-carbide tools. The life between grinds was increased from ½ hr. for the former tools to 9 hr. with tungsten-carbide, and the number of pieces secured between grinds was approximately 300 on the steel tools to an average of between 5000 and 6000 pieces with tungsten-carbide. As there were two bosses faced on each cover, the total number of holes bored between grinds is twice the above or 10,000 to 12,000 holes. The life of the former steel tools used for the reaming operation, which is performed on an automatic machine, was extremely short. By the introduction of tungsten-carbide to this job, maintaining the same speed of 140 ft. per min., with a cut of 3/32 in., the life of the tools between grinds was increased from 9 hr. to 45 days.

Counterboring Clutch Facings

In the Multibestos Co., Walpole, Mass., tungsten-carbide tools (Fig. 1) have been applied to their brake-lining and clutch-facing jobs. The material used in the clutch facings is very soft and pliable to the touch, but extremely abrasive on tools when operated at high speeds. When they were using a good grade of steel tools they lasted about 7½ hr. before requiring regrinding, producing approximately 800 pieces per hr., or a total of approximately 6000 finished pieces per grind. Twelve holes were counterbored in one operation, and approximately 2½ hr. down time was required for regrinding.

When tungsten-carbide was tried on this job 75,000 pieces were counterbored before the tools needed regrinding. By the great reduction of down time, production was increased more than 1600 pieces daily. This increase not only stepped up production but helped to make a favorable reduction in the costs of this part.

Machining Brake Drums Complete

Due to the intermittent heating and cooling of the brake drums the development of a material best suited for this use is a difficult problem faced by the automobile manufacturer of today. One of the leading automobile builders in Detroit conducted an extensive research and development program in order that they might select a material possessing the qualities that would withstand intermittent heating and cooling, and at the same time have long life. Different types of material and methods of heat treating were tried before they selected their present standard, which is a hard cast iron known as Molybdenum Alloy Duplexed Electric Furnace Iron.

The physical properties of this metal give a tensile strength of 50,000 lb. per sq. in., with a Brinell hardness of 235 to 269. It has a hard, fine grain, and possesses good wearing qualities.

The next problem confronting their engineers was the selection of tools for the machining of this hard material. High-speed steel tools were tried, but it was found they were unable to turn the outside diameter of the brake drum. After applying tungsten-carbide to this job as in Fig. 3 it was found that all 12 operations required on turning the outside diameter of the brake drum could be handled in one operation. The machine used was a modern heavy-duty automatic lathe, and the time required to complete the 12 operations was 6 min.

The maximum speed attained on any of these tools is 133 ft. per min., and the cuts run from 1/16 in. to 3/16 in. deep. When the tools are sharpened approximately 1/64 in. is removed due to the extremely severe application.

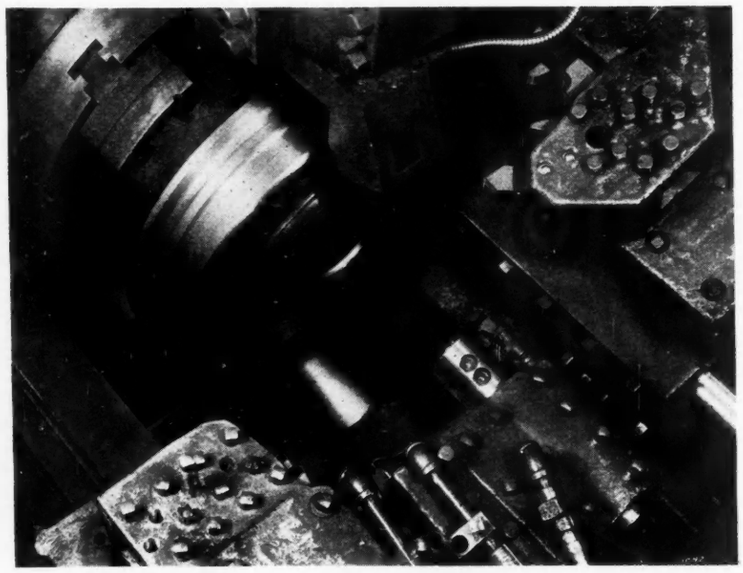


Fig. 3—A 12-tool set-up for machining O D. of brake drums + + + + + + + + + +

There are nine operations required for turning the inside diameter of the brake drum which is also done on a modern heavy duty automatic lathe. The operations on this machine are so timed with the machine turning the outside diameter that one operator is required for both machines.

The maximum speed is 188 ft. per min. which is attained by the tool facing the flange. The rough casting as it is received weighs approximately 51 lb. and after both the outside and inside operations are performed the finished brake drum weighs approximately 24 lb. This means that 27 lb. of metal is removed by the tungsten-carbide tools in two separate operations of 6 min. each.

Two interesting machining operations on the aluminum crankcase were also observed. Counterboring the support arm has given them a great deal of difficulty as it is located at the lower part of the casting and hard particles contained in the molten metal settle in this section. When using high speed steel counterbores, 14 pieces were obtained per grind but with the application of tungsten-carbide they received 1310 pieces (average) per grind. The speed and feed were the same in both cases.

A 20-in. 33-blade inserted type-milling cutter on a planer type mill was used for rough milling the oil pan face. When high speed steel blades were used 75 to 100 pieces were obtained before regrinding as compared to 8000 to 11,000 pieces per grind for tungsten-carbide tipped blades. The high-speed steel blades were sharpened every other day, requiring a down time of three to four hours, while the tungsten-carbide tools required grinding once in three months. Sixty grinds could be had per set of high speed steel blades against 70 grinds for tungsten-carbide-tipped blades. Speeds, feeds and depth of cut were the same for both cutters.

Before making any tungsten-carbide tool application in this plant the job is carefully studied. Cost of tool, cost of grinding, life of tool, increase of machine speed possible and other factors are given consideration with the result that tungsten-carbide tools have enabled this quality automobile manufacturer to make remarkable savings.

Machining Cylinder Block

Recently a large engine builder finished an unusually complete tungsten-carbide tooling set-up shown in Fig. 4. As yet it is impossible to obtain production figures on all the jobs, so several different operations are mentioned.

Milling the oil pan side of the block.

Rough milling oil pan joints and bearing passes.

Rough and finish top side and both sides of the support bracket pads and support lugs.

When milling the cylinder blocks, with the former type of tools, they secured eight blocks per hour and after adopting tungsten-carbide they were able to get 22 blocks per hour. With the former tools the cutter heads had to be changed every five hours as compared with tungsten-carbide blades which stood up all day. The saving in time on the production by adopting tungsten-carbide more than justified its adoption.

Rough boring of cylinder barrels.

Rough boring valve throat and valve guide holes.

On the fly cutting of the valve guide holes and the finish cutting of the valve throat a production of 4900 pieces was obtained with the tungsten-carbide tools as compared with 3600 with high speed steel tools per grind.

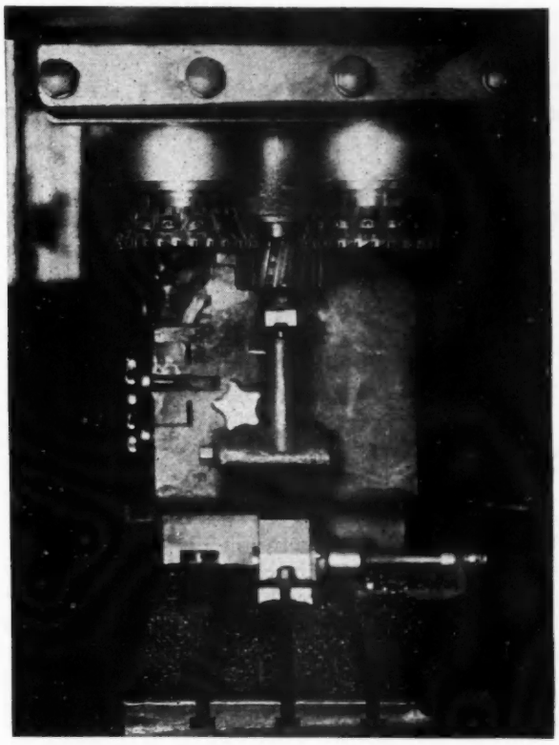


Fig. 4—Set-up showing tungsten-carbide tipped milling cutters for cylinder block

Various size holes are drilled on the manifold side of the block in one operation. The 1¼-in. drill is tipped with tungsten-carbide which permits the smaller drills to operate at higher speeds than formerly. This materially steps up the pieces per hour as compared with the former method.

New equipment was installed throughout the entire line for turning, boring and grooving the pistons. This installation together with tungsten-carbide tools enabled them to make a saving of 64 per cent per piston. The life of the grooving tools is approximately 18,000 pieces, the turning tools, which take an intermittent cut over the pin hole is approximately 8000 pieces and approximately 25,000 pieces on the boring tools. A survey in their plant shows that a saving of approximately 60 per cent was made by adopting tungsten-carbide-tipped blades with the renewable type milling cutter for their different milling jobs.

It is problematical whether the industry as a whole realize what is in store for them in the near future. Extreme production economies will be required due to the period of severe competition experienced in all lines. Constant research on the different parts of the automobile is continually being made with the result that castings of a finer and closer grain have been adopted. Due to the higher hardness obtained it was necessary to go to tungsten-carbide to keep their cost in line with the public demand, which requires a higher quality at lower prices. The construction of manufacturing equipment that is being placed on the market incorporates higher operating speeds, greater rigidity and accuracy. It is only logical to assume that tungsten-carbide will play an important part in assisting the cutting tool field to keep abreast of the times.

Recent Developments Include Triple and Quadruple-Action Power Presses

GOING over the record for the past year or so, we find evidence of marked improvements in the design of power presses for drawing, forming, assembling, etc. Except in specific cases to be mentioned later, these advances are largely refinements of well-tried principles.

Probably the most significant changes have taken place in the design of clutches and clutch-operating mechanisms. One noteworthy design of recent origin is an improved multiple-disk friction clutch with an independent brake.

Hydraulic pressures for presses in the automotive industries are fast becoming a decided factor. The rapid strides made in recent years have practically revolutionized hydraulic press operation. The speed of the press has been increased to coincide with greater production requirements.

In the past, one of the biggest drawbacks in the installation of hydraulic equipment was the inconvenience of providing an accumulator system, which was essential before an hydraulic press could be operated. In recent years there has been a marked tendency to eliminate the necessity for auxiliary equipment of this type by replacing water pressure with oil pressure, making the complete unit self-contained.

Most production executives are familiar with the hydraulic cushion die bed which has proved so successful as an auxiliary for standard presses. Not the least of its advantages are: improved die performance, longer life and less wear and tear of the press equipment. Very recently the manufacturer of this equipment brought out a line of presses and a die-spotter incorporating the cushioned bed as an integral feature.

On small and medium-sized presses, welded construction has made considerable headway. Many manufacturers now offer certain models with welded structural steel frames and bed. While this construction has many desirable features for medium duty, several feel that heavy-duty service demands steel or high-grade semi-steel castings of heavy cross-section.

More and more emphasis is being placed on safety devices. One of the most interesting applications we have seen was described in *Automotive Industries*, March 7, 1931.* Photocells also are very much in the limelight in this field.

Although the principle of triple and quadruple-action presses is not new, at least to press designers, a number of new machines have been developed recently. One of the best examples of current design is a triple-action press which was described in *Automotive Industries*, April 25, 1931.†

As a matter of interest it will be profitable to examine in more detail some of the improvements mentioned above. A typical example is the multiple-disk friction clutch with an independent brake which was announced recently by a prominent press manufacturer. This device embodies some of the latest ideas in clutch mechanisms for medium and large-sized power presses where a positive clutch is not practical and where it is essential for the operator to have absolute control over the movement of the press.

The salient characteristic is ease of adjustment. This is accomplished by a threaded ring which may be easily locked into place. Just a turn of the ring to the right or left will give more or less clutch pressure. The disk and housing are mounted on one side of the flywheel, while the operating parts are on the opposite side, thus distributing the weight evenly about the center of the flywheel. The flywheel is mounted on roller bearings which are easily adjusted from the outside of the clutch without removing any parts.

Another new feature brought out by the same manufacturer is an automatic, fluid clutch control which is an improved form of operating device that is fast and positive in action. A very little pressure on and a short travel of the control lever are necessary to engage the clutch or apply the brake.

An improved principle of press operation introduced and patented by one of the principal builders of hydraulic presses makes it possible for each press to be self-contained. A tank overhead containing the oil fluid is made an integral part of the press. Oil pressure is generated by a high-speed radial high-pressure pump which is no larger than the motor required for its operation. Power is generated and transmitted in this oil pressure system in a series of rapid impulses.

One of the advantages claimed for oil pressure is in the increased operating speed. With this method an unusually rapid advance of the ram is possible.

The indications are that larger and larger presses will be required of proportionately more massive construction. Only a few years ago presses weighing in the neighborhood of 200,000 lb. would have been considered enormous—yet one press builder recently completed a machine weighing over 800,000 lb.

*Knockout and safety attachment boosts production.

†Developments in production and design mark new Briggs all-steel bodies.

Electrochemistry Has Contributed Much to Automotive Industry

by Dr. Colin G. Fink
Columbia University
Secretary, The Electrochemical Society

THE scope of the Electrochemical Society embraces many processes and products which have contributed largely to the advance of the automotive industry. Without the electric furnace and the electrolytic cell, there would be no automotive industry today. Some of the outstanding developments in electrochemistry, electrometallurgy and electrothermics in recent years were summarized at the two technical meetings held this year, one in Birmingham, Ala., April 23-25, the other at Salt Lake City, Sept. 2-5.

For the purpose of this discussion, designed to show recent progress in this field, we may lay particular emphasis on the following activities:

1. Electric furnace development.
2. Economical production of metals from fused electrolytes such as aluminum and magnesium.
3. Aqueous solutions for the production of pure copper and for plating and cleaning.

Now what of the influence of these upon the automotive industry? Beyond a doubt, the electric furnace has made the heaviest contribution. It has made possible the economical and large-scale production of essential alloy steels such as tungsten, molybdenum, nickel, chrome nickel, chrome vanadium, and others. It is extensively used in the production of ferro alloys —the nickel and chrome nickel irons so essential to the manufacture of present-day cylinder blocks. Due to the electric furnace, the finest alloy steels in the world can be made to comply with the severest specifications. The electric furnace will produce higher temperatures and turn out the product in a shorter time than any of the fuel-fired furnaces used in the past.

At the fall meeting, Moore* summarized the chief advances in electric furnaces briefly as follows:

"In this period of two decades the electric arc melting furnace has made wonderful progress, having increased in number 65 times, in maximum size per heat five times, in maximum daily capacity 10 times, and the power consumption per unit ton output has been decreased from 600-800 to 400-600 kw.-hr. The carbon electrode consumption decreased from 30-40 lb. (14-18 kg.) down to 8-15 lb. (3.6-3.8 kg.). The total conversion cost on the output has been correspondingly decreased by reason of these improvements, as well as by reason of the more rapid type of operation, and the lower maintenance, refractory and slag costs. It is predicted that within the next two decades the modern *rapid* type electric furnace will have displaced a large percentage of open hearth furnace capacity, both in the commercial steel mills of this country, and in the foundries. In addition to this, the electric furnace will undoubtedly displace a large part of the cupola gray iron capacity for iron foundries and of the air furnace melting capacity in malleable iron and chilled iron foundries."

A significant feature of electric furnace design is the development of suitable electrodes. This was covered by Sem,† who outlined the principal advantages of the Soderberg electrode and some of the recent improvements in its installation. This paper also was read at the last meeting of the society.

Aircraft progress has been accelerated by the electric furnace in the economical production of metals from fused electrolytes such as aluminum and magnesium. The strong alloys of these play an important role in aircraft structures and engine elements. One of the most promising developments in the offing is the use of Beryllium in the production of very strong alloys of aluminum. Beryllium has not been available commercially up to the present time but a process is being investigated which may result in the production of this element from a solution of beryllium salts in ammonia instead of in fused salts.

Perhaps the most familiar activity of electrochemistry is in the field of aqueous solutions embracing the common forms of electroplating. Much progress has been recorded in this field recently. In galvanizing, the best practice today is the use of a zinc cyanide bath with a little mercury added. This method is employed in the electrogalvanizing tire rims.

Nickel plating has made rapid strides. One large automotive manufacturer now uses a high acid bath which not only produces a better finish but cuts production costs by reducing plating time.

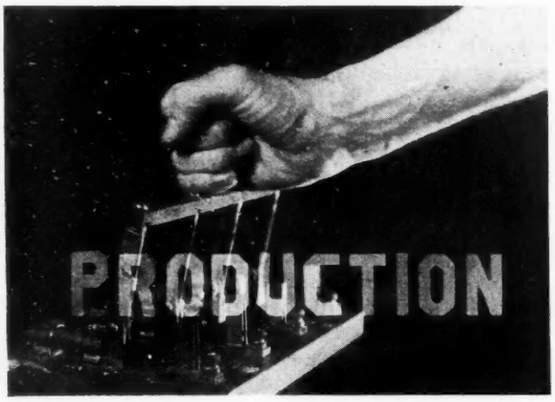
(Turn to page 590, please)

*Twenty-year Advance in Electric Arc Furnaces for Production of Iron and Steel, by W. E. Moore of the Pittsburgh Electric Furnace Corp.

†The Soderberg Electrode, Oblong Electrodes and Other New Developments, by M. Sem.

S. A. E. Production Meeting In Scramble for Supremacy Must

by Joseph Geschelin



IN the judgment of many, the 1931 S.A.E. Annual Production Meeting held in Detroit last week was one of the most significant ever staged by the S.A.E. Although attendance set no records, those who came are important men in the manufacturing personnel of many of the largest companies in the automotive industry. And they came because the technical papers promised an explanation and perhaps a solution for some of the most baffling problems confronting production men today.

As a fitting climax, the meeting wound up with the Production Dinner on Thursday. We, of the production activity, looked forward to the dinner with great anticipation mixed with some anxiety because of the novelty of the program. But Louis Ruthenburg, A. K. Brumbaugh and Dr. Phillips Thomas put over with a bang the most spectacular session we have attended.

A. K. (Brummy) Brumbaugh captivated the folks with an excellent performance as toastmaster. He told the one about a Harvard man and a Princeton man. He'll be glad to repeat it if you haven't heard it before.

Everybody got a kick out of listening to Louis Ruthenburg, pres., Copeland Products, Inc., who was the speaker of the evening. Mr. Ruthenburg is of the automotive industry and now sufficiently detached from it to see things in a different perspective. And his sympathies lie strongly with the production man and his problems. He visioned the growing importance of the production man and predicted a still greater dependence upon him due to the scramble for lower costs and new business in the very near future.

The speaker drew an interesting analogy between the present depression and the one of 1921. In his opinion the automotive industry today has followed general business more closely than in 1921, thus indicating that we are in or at the saturation point everybody has been talking about. But it is evident that production now is below replacement requirements. This, plus the requirement of normal demand, has created a wonderful potential business.

Like many other important executives, Mr. Ruthenburg believes that manufacturing equipment is destined to play an increasingly important role in production. To face the competition in the offing, the manufacturers of cars and parts must take advantage of the latest equipment on the market. Otherwise, they will surely lose out in the struggle for a better product at lower cost.

He held out the Swope Plan as a challenge to industry. It will be infinitely better for industry to take the initiative toward labor and social problems than to

Dr. Phillips Thomas made electrons eat out of his hand at the Production Dinner +

Speaker Says Winners Use New Machine Tools

Louis Ruthenburg, president of Copeland Products, believes that manufacturing equipment is to play an increasingly important part in production + + +

leave their solution to legislation of the states.

Our hat's off to Dr. Phillips Thomas, of Westinghouse, who makes electrons eat out of his hand. His lecture and demonstration of "Electrons at Work and at Play" was so entertaining, so educational, and at times so spectacular that it rivaled any kind of professional "talent" customarily employed. Dr. Thomas held his audience in rapt attention for almost an hour and a half. And they would have taken more. Some people actually stood up during the entire performance so as to get a better view of the apparatus.

By discussing the immediate problems of production, the technical sessions assumed a practical significance that led to some real discussion on the floor. Take for example the matter of metal cleaning. The cleaning of bodies and sheet metal parts still appears to be one of the perplexing problems in many plants. Methods of cleaning, an explanation of causes of failure, and a solution, are found in a scholarly and intensely practical paper, "The Cleaning and Preparation of Sheet Metal Parts for Enameling," by F. P. Spruance of the American Chemical Paint Co.

F. P. Spruance of the American Chemical Paint Co. presented an intensely practical paper on metal cleaning +

An important development of this session was a brief talk by C. F. Dinley of Rex products describing a new solvent type automatic washing machine which is being demonstrated for the first time. The most important feature of the machine is a patented chlorinated solvent, chemically fixed so that it does not break down in the presence of water or moisture.

According to Mr. Spruance, "On investigating the products of the various cleaning methods by means of the salt spray cabinet and the humidity cabinet, it was found that an alkaline condition of the water used for rinsing after the alkali dip was largely responsible for the failures of the enamel finish. This was first ascribed merely to alkali carried over into the rinse water; but it was found that, even where alkalies were not used, the spots still developed. This led to the conclusion—surprising enough, but fully confirmed later—that in practically all manufacturing centers enough alkali is normally present in the city water to leave spots which, under certain conditions, will cause failure of the enamel. Indications of such failures were obtained on leaving test samples as little as 12 hours in the humidity cabinet.

It was observed that the rinse water tended to collect on the freshly cleaned surfaces in drops. As the parts passed through the drying chamber, evaporation caused the traces of dissolved alkali to collect mainly at the periphery of the drops. These faint "water spots" were the places where rust eventually developed. Alkaline salts are hygroscopic, and no enamel coat is completely waterproof. It followed that, in a hot, humid atmosphere, enough moisture sooner or later penetrated the enamel to hydrolyze the alkaline deposits and eventually create rust. So rapid was this action under certain conditions that freshly enameled parts passed by the inspector one day were found a day or two later showing spots under the enamel. With somewhat less humidity, the parts were boxed and shipped, only to be found unfit for use when opened.

The paper then described the use of "Deoxylyte," a special form of phosphoric acid to eliminate the condition already discussed. It is added to the last rinse both in the proportion of 1 gal. to 5000 gal. A stronger solution (4 per cent by volume) is used by one manufacturer to neutralize invisible rusters after washing and rinsing.

Another recent development described is Bonderiz-

J. W. Meadowcroft of the E. G. Budd Mfg. Co. gave some interesting experiences on welding at his company's plant + + + +

ing, which has been adopted by several large manufacturers. The speaker described Bonderite "as a mixture of manganese dihydrogen phosphate with a very small amount of copper phosphate. After the solution has aged, a certain amount of iron is dissolved from the material being processed; hence the solution then contains manganese and iron dihydrogen phosphates, with a small amount of copper phosphate. The solution is kept at or near boiling temperature by steam coils in iron tanks, and the parts are hung on a crate or carried into the bath by a conveyor. Before treating, the parts must be freed from grease or oil. After treatment they are rinsed in boiling water.

"The main reaction is much the same as in the Parker process, in that the manganese dihydrogen phosphate reacts with the iron and converts the surface into a non-hydrogen phosphate of iron and manganese. The effect of the copper phosphate is to accelerate the action so that the coating is completed in ten minutes."

The paper also describes for the first time the practical application of "Paradox," which was announced in *Automotive Industries* early this year.

"For simplicity, Paradox may be regarded as similar to an enamel primer or 'rubber' coat. In reality it is quite different, because the phosphates it contains are decomposed during the drying operation and react with the metal to produce ferric and ferrous phosphates. The result of this is partly to overcome any rusting tendency due to invisible rusters on the surface, and partly also to etch the surfaces slightly, thereby creating the much-desired bond between the steel and the paint.

"In carrying out the Paradox process it is necessary to have the parts free from oil.

"In the process the decomposable phosphates are included in the primer itself and react with the steel when the primer is baked.

"Paradox primers require a certain minimum baking to complete the reaction between the phosphates and the steel surface. In other respects they are treated like ordinary primers. They bond strongly with the metal surface and are not easily separated by bending.

Dating from the Production Meeting in Cleveland in 1929 many people have discussed the matter of chips and turnings. It is really alarming to estimate the economic waste due to chips. Two processes in the offing, which will affect the question profoundly, were the subjects of papers read at the technical session.

The first of these was "Hot Coining," by J. H. Friedman of the National Machinery Co. It described in detail many recent accomplishments in semi-hot and cold coining with the "Maxipres," which was described recently in *Automotive Industries*. By virtue of rigidity achieved through massive construction and tremendous pressures, the "Maxipres" is accomplishing almost unbelievable results. Metal is caused to flow into any form and section with perfect accuracy and freedom from warping in large work such as brake drums, brake shoes, etc.

Forgings coined in this process are produced to tolerances which eliminate machining in many cases and are sized ready for use as they come off the press.

Among other advantages is the fact that parts are free of scale as they leave the press. But perhaps the biggest economy is in the production of odd-shaped parts which are difficult and expensive to finish by machining. These may be coined within a tolerance of 0.002 in. in contour and dimensions.

Metallurgists were amazed at the demonstration of coining a taper roller-bearing retainer from tubing. The material is cut from tubing which is machined inside and carburized. Then it is coined to size ready for grinding operations.

Non-ferrous parts are forged directly from slugs into any desired form. The metal flows perfectly even in sections which would be considered thin for usual forging practice.

On the same program the problem of eliminating chips was tackled in different fashion by J. L. Dostal, manager of the Holley Permanent Mold Machine, Inc. His method is to produce clean, accurate, sound castings by the permanent mold process.

Castings produced by the Holley process are of close-grained gray iron. The chief feature is the use of permanent metal molds on automatic twelve-head casting machines. On castings without cores only two men are required per machine. One pours, the other ejects

J. L. Dostal, manager of the Holley Permanent Mold Machine Inc., explained how clean accurate casting eliminated waste +

J. H. Friedman of the National Machinery Co. in explaining hot coining made waste seem superfluous + +

the finished castings. For cored work, a third man sets in the core pieces.

Here are some advantages and economies stressed by Mr. Dostal in his talk:

"1. The castings are uniform as to size, simplifying the checking and jigging operations.

"2. They are of uniform hardness, insuring maximum cutting speeds from day to day.

"3. Considerable saving in down time on machines due to the necessity of less frequent grinding of tools, cutters and drills, for, unlike the sand castings, permanent mold castings are free of sand scale.

"4. Freedom of sand on moving parts of a machine or those which come in contact with the oil circulating system.

"5. Advantage of space required to produce the same quantity of castings in the ordinary sand foundry, for the tremendous capacity of our power machines will produce eight to ten times the quantity of castings on given floor space that can be produced in the ordinary foundry.

"6. The low cost of producing certain castings due to the automatic features of the machine which sets the pace for the men. And the fact that most of the hard labor of making a sand mold is done entirely by the machines.

"7. Cleaner and more healthy condition for the working men.

"8. The ability to obtain work immediately after casting for inspection for defects instead of having to wait hours and sometimes until the next day before the castings are shaken out of the sand and rattled so they can be inspected.

"9. Close-grained structure and freedom from all shrinks even in the very heavy sections.

"10. Increased tensile, transverse, especially compression and impact strength due to the uniformly close grain, making the casting very suitable for high-pressure requirements."

According to C. B. Stiffler of the Oakland Motor Car Co., who read a paper entitled "Inventory Control," present practice of gearing inventories closely to sales has effected some startling economies. The cost of moving material is said to be only 20 per cent of what it was 10 years ago. The capital employed is only about 25 per cent, due to increased turnover. The record of the General Motors group is an average turnover of 18 times in 1929.

The practice at General Motors is to work on the basis of a monthly forecast of operations. Thus, "Each month, each car division of the corporation submits a definite forecast which shows, along with other information, the number of automobiles it is estimated will be sold at retail by dealers, the number of automobiles which the division expects to sell to the dealers, and the number of automobiles to be produced by the factory to realize these sales. This forecast covers the current month and the three forward months. The key to the whole forecast is the estimated retail sales. Each car division receives from its dealers every ten days, in addition to other information, the actual number of cars delivered to consumers, together with the stock of new cars on hand. A continuous record of this information of retail car sales and stocks by periods over a number of years establishes reasonably accurate trends. These trends, used in conjunction with the knowledge of economic and other conditions prevailing, make it possible to forecast the retail sales for the forward three months with sufficient accuracy for the purpose of determining material requirements and scheduling production."

In addition to other economies, close inventory control is found to regulate obsolescence of stock.

Much of the discussion of this paper concerned the position of the parts maker under the present scheme of inventory control. It was pointed out in many cases, particularly when schedules are reduced, that the parts maker is found "holding the bag." It was agreed unanimously that inventory control by the car maker must be consistent with good business if it is to produce economies all the way down the line.

Admittedly, however, parts makers must tie in with the practice of the car builder and operate more flexibly than ever before. Because the practice from now on will be to build according to consumer demand.

At the opening technical sessions a paper on Welding written by J. W. Meadowcroft of E. G. Budd Mfg. Co. was read to a sizable group of welding experts from many body and car plants. Starting with a discussion of all-steel body design and advantages as demonstrated by the Budd organization, the paper enters a discussion of resistance welding which constitutes the bulk of their production.

Probably for the first time, details of the process of welding large sheets were described. Two special electric flash welding machines are employed for this purpose.

These machines flash-weld two sheets of 18-ga. material 120 in. long in any desired width, thus producing extra wide, long sheets, necessary in the building of a one-piece body side. Accurate alignment of work for flash welding is found to be absolutely essential. In fact, good practice demands an alignment of metal edges within 0.005 to 0.015 in.

Budd practice in electrode utilization and design is very interesting. In the first place the objective is to produce an electrode which will have long life between redressings. Where possible the points are cooled to within ½ in. of the working end. Experience has shown that life is shortened materially if the points are permitted to overheat. Finally, economy is achieved through standardization of electrode blanks. Electrodes are considered as small tools in their plants and are drawn from tool stores on that basis.

JUST AMONG OURSELVES

1932 Will Favor Single-Chassis Lines

LOOKS like the old pendulum might be starting to swing back again toward a decrease in number of chassis models per manufacturer. After Henry Ford made his first success, there was a tendency on the part of a good many manufacturers to hold down to one or a few chassis models. Then the trend changed. Gradually each individual manufacturer sought to cover a wider and wider range. With multiplication of chassis models came multiplication of color options, body models and everything else about the car. No dealers and few distributors have been able to carry a "full" inventory of current body models for several years.

Now several manufacturers are going back to the single chassis model idea for 1932. How far the tendency will spread we don't know yet. Manufacturing economies are having something to do with the change, of course, but it is probable that the hope of decreasing merchandising problems is playing a part as well.

It will be worth watching what happens as regards number of chassis models per manufacturer in both the car and truck field during the next six months or so.

Juggling Keeps Prices in the Air

THE whole price structure of automotive products is in a peculiarly muddled state these days. Parts, accessories, cars, trucks—all can be purchased by users for less expenditure of cash than a year or two ago; yet one can't put his finger on any big general decline in the price structure.

Prices have been kept up in much the same way as wages were kept up—rates didn't change but actual payments were less by whatever name the reductions were called. Of few automotive products can one say "It cost so much a year ago; it costs so much less today."

Car prices have been materially decreased—secretly but not too subtly—through price cuts to dealers and big trading allowances to the public. Truck prices have been cut in the same way—only more so in some instances. Parts prices are down through extra discounts to jobbers, extra discounts by jobbers to retailers and cut prices by retailers to the public—sometimes. But through it all, no widespread cutting of list prices has taken place.

Heigh ho! When is a price cut not a price cut. . . .?

And on Another October 5—

HERE'S a statistical calculation of no importance or meaning—just one for the book, in other words. For the same amount of money as was needed to buy one share of General Motors common stock on June 25, 1930, one share each of General Motors, Hudson, Hupmobile, Packard and Marmon could have been bought on Oct. 5, 1931.

And for the price of one share of Auburn at its low of 84½ on Oct. 5, one share of each of the following could have been bought on the same day: Chrysler, General Motors, Hudson, Hupp, Marmon, Nash, Packard, Peerless, Reo, Studebaker and Willys-Overland.

Payment Terms That Are Not Like Home

DEPT. OF COMMERCE has just gotten out a new booklet on "Credit and Payment Terms in Foreign Countries." For Argentina, among others, the terms on different types of products are tabulated. Interesting to run down the column and find usual terms on different commodities ranging anywhere from 30 to 120 days after sight until one gets to "Motor Vehicles." There one finds "Cash against documents." Only two other commodities, it appears, are sold to the Argentine on this or some more stringent basis—fresh fruit and vegetables (on which cash in the United States is required) and industrial machinery.

Without having analyzed the booklet carefully, we were surprised in our scanning, however, to note the number of countries in which motor vehicle purchases are made on a basis of 30 to 90 days after sight. Some such terms are common, of course, throughout the accessory and shop equipment trade.

For all except those working daily with these matters, this pamphlet will be of real interest.

—N.G.S.

Recent Conveyor Installations Show Marked Improvement

by. J. E. McBride
Vice-President and Chief Engineer
Palmer-Bee Co.

NEW material handling developments in this industry seem to keep pace with improvements and developments in the automobile itself. Each year sees a refinement in some particular part of a standard type of conveyor. Conveyor manufacturers quickly take advantage of finer and more durable steels, precision bearings, better castings and drop forgings, made possible by their development in the automotive industry and the great volume in which they are used.

Overhead trolley conveyors are now universally used for the transportation of materials throughout all plants. These are built with almost no limitation to capacity, length or direction. Several designs are in use, the selection of which depends largely on the length and load to be carried. The 4 in. I-beam monorail is very popular, used in connection with comparatively light chains and light trolleys. Where great length is required beyond their rated capacity, multiple drives have been used with varying success. Horizontal turns are made with stationary ball bearing rollers engaging the surface of the chain.

Where greater durability and smoother running conveyors are desired the double T-rail or double angle track types are preferred. These designs permit the use of large diameter trolley wheels fitted with anti-friction precision bearings and chains of greater strength with transverse joints at the trolley attachments, all of which permit maximum individual loads combined with great length of conveyor with one single driving mechanism. Horizontal turns are made with anti-friction bearing traction wheels or sprockets so that approximately 1 per cent coefficient of friction can be used to determine the chain pull.

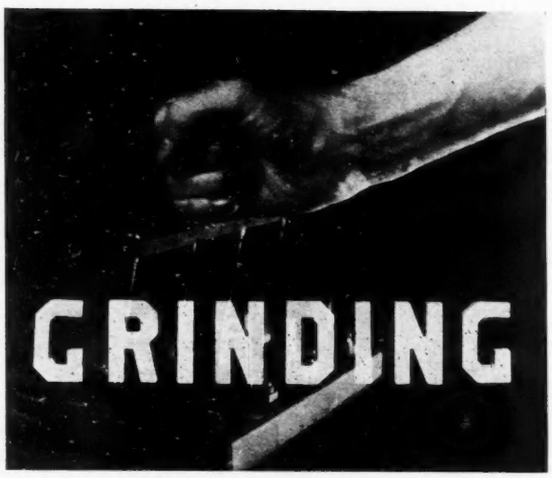
While the monorail conveyor is no longer new to the manufacturing industry, the more recent installations show many improvements in design which greatly affect the maintenance and durability and are, therefore, a greater satisfaction to the user.

A new conveyor for the transportation of materials has been brought to the attention of the public during the past year and a half, although it has been in the course of development for about 10 years. It has been called the "Carryall Conveyor" by the manufacturer. It has all the advantages of the overhead monorail conveyor as to length, load, and direction of movement either in a horizontal or vertical plane. The loads, however, instead of being suspended are carried on pallets or platforms of varying design supported to T-rail or angle tracks underneath by chain attachments fitted with roller bearing wheels. This type of conveyor is designed to handle the lightest loads of a few pounds up to individual loads as high as 10 tons. It is applicable for the transportation of materials in any industry where the loads to be carried are preferably supported underneath rather than suspended. In the automotive industry it has been used for the transportation of motors, seat springs, foundry mold conveyors, cores from baking ovens to molders, the collection, distribution, and shipment of service parts and numerous other applications.

During the past two years conveyors of comparatively recent and new designs have been extensively used by the leading manufacturers of large production foundries for the continuous molding and setting of cores, and pouring, cooling and shaking out of castings. These improvements have been largely due to the use of manganese steel to resist the destructive action of sand and thoroughly sealed anti-friction bearings.

Another important step in advance in foundry production has been the baking of cores on conveyors through both horizontal and vertical ovens. For this purpose it has been necessary to develop a means of lubricating anti-friction bearing conveyors through high temperature baking zones of long duration. Much experimental work had to be done due to the size of

(Turn to page 589, please)



Proper Success

by Coleman Sellers, 3rd
of William Sellers & Co., Inc.

Survey of automotive plants shows that there is a decided lack of uniformity of practice in handling this type of cutting tools + + + + + + + +

THERE seems to be little doubt that tungsten-carbide as a cutting material is here to stay. Not that it will entirely replace other cutting materials, but there are many operations on which it can be used to advantage in spite of the high cost of the tools.

The importance of grinding tools assumes a different aspect with tungsten-carbide. It is well known that high-speed tools give better results when properly ground. However, poorly ground tools, provided they have sufficient clearance, will cut to some extent, and errors in grinding are not always apparent. With tungsten-carbide the success or failure of the tool often is determined by the grinding. This is due partly to the nature of the material. The tensile strength is low, and when the edge becomes dull, the pressure immediately builds up to a point where it will break or chip the edge, causing failure. This is expensive for two reasons. The grinding process is comparatively slow and the material ground away is costly. Then, too, the angles of rake and clearance have an important effect on the cutting qualities, and unless the edge is fairly keen and free from nicks, failure will usually occur. All this increases the necessity of grinding tungsten-carbide correctly.

Tungsten-carbide has hardly been in use long enough to have the methods of grinding it standardized. Many firms have experimented and determined what they thought was the correct practice, but it would be a remarkable coincidence if all hit upon the best procedure at the same time.

In order to assist in the standardization of grinding practice and methods of handling tools, a survey was made of the practices of a number of the leading firms in the automotive field. It is the purpose of this article to set forth the conditions found, and to discuss the various points covered.

Seven plants were selected from those visited as being representative. All manufactured automobiles or parts for automobiles, and all were large, nationally known concerns. Partially complete data were obtained from five other well-known companies and are included.

All the plants used enough tungsten-carbide to have considerable grinding to do, and had been working with it long enough to have established a definite procedure.

Extent of Use

It is difficult to obtain accurate figures on the number of tools in use in the various shops. One company had an investment of $60,000 in tungsten-carbide, including all types of tools. The grinding department resharpened approximately 100 cutting tools and 40 milling cutters per day. They stated that they were tooled up on 75 per cent of all jobs suitable for this material. It is interesting to note that they have established a complete list of standards for rake and clearance angles for milling cutters and other tools. The manufacturers' recommendations were followed as far as they were found satisfactory. When there was any difficulty they experimented until they obtained good results and then changed their standards accordingly.

Another plant estimated there were 300 tungsten-carbide tools on hand and that they figured roughly that they had this material on about 40 per cent of the jobs they considered suitable. This included cutting cast iron, aluminum and bronze. They had had no success in turning steel.

The opinion on all sides was that more and more tungsten-carbide would be used. Those whose ap-

Figure 1
Table showing variation in grain and grade of wheel used. 12 firms represented.

	60	80	100	120	Total
H	1	1	1	0	3
I	2	0	1	2	5
P	1	2	0	2	5
S	1	2	0	0	3
T	0	0	1	1	2
	5	5	3	5	

Grinding Practice Assures of Tungsten-Carbide Tools

plication was somewhat limited were convinced that it was only a question of time before they would be tooled 100 per cent on all suitable work.

One man expressed the opinion that machine tools must be redesigned before tungsten-carbide can be used universally. Several companies felt that they could not go much further until the price of the material became lower. There is undoubtedly some ground for both of these objections, but, on the other hand, there is the widespread application in some of the plants where they feel they are justified in using a large number of tungsten-carbide tools.

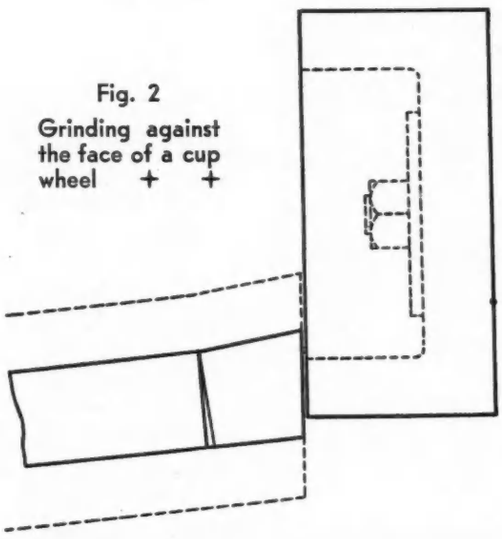


Fig. 2
Grinding against the face of a cup wheel + +

The majority of tungsten-carbide tools used to date are standard lathe tools or bits, with some form tools. Milling cutters have made considerable progress this year, although only two plants were found to be equipped with a large number of tungsten-carbide-tipped cutters.

In all plants visited the tools were ground in a central tool-grinding department, and one or two men were detailed to take care of tungsten-carbide tools. They found that while the operation of grinding was not difficult, the procedure differed greatly from grinding high-speed steel. It was necessary to use more care in handling the material, different grinding wheels, and in some cases different methods of holding the tools while grinding. It was realized that the angles of rake and clearance were different and must be held to close limits for satisfactory service.

The general practice was for the engineering department to be responsible for every new application of tungsten-carbide. They established the angles of rake and clearance, usually following the manufacturers' recommendations. A close control was maintained by watching the withdrawals from the stockroom.

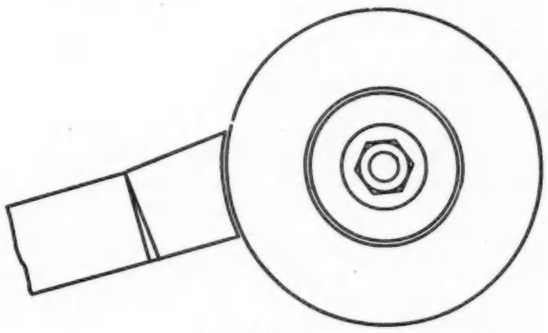


Fig. 3
A tool ground in this way produces excessive clearance under the cutting edge

Practically all shops ground tungsten-carbide tools on pedestal grinders furnished with cup wheels, grinding on the face of the wheel. In a few instances they also used surface grinders for certain types of tools, or when the others were overloaded, and the majority rounded the corner of roughing tools on a disk wheel mounted in a pedestal grinder.

In cases of milling cutters, the usual type of cutter grinder was provided.

Most of the grinding was done on the grinding machines already in the shop, but in at least three cases new pedestal-type grinders were purchased for tungsten-carbide tools. It was found that the older machines did not give satisfactory results. If the spindles had play or there was lost motion in the slides, a smooth, accurate job could not be produced. It was found that the "off-hand" method (tools held by operator) could not be used satisfactorily in grinding tungsten-carbide.

Many of the grinders were double ended, carrying two wheels. In some cases roughing was done on one end and finishing on the other.

The method of holding the tools while grinding varied. About one-third of the companies used tilting tables to set the angles. The tool was moved across the wheel by hand, a guide maintaining it square with the wheel The remainder of the shops used standard tilting vices or special vices or fixtures of their own make. The tool was set up at the desired angle to the wheel, and the fixture moved by hand across the face of the wheel.

In every case but one all the grinding was done dry. The one exception had one pedestal machine equipped with water, and several machines grinding dry. The flow of water required for fast grinding necessarily splashed the operator somewhat.

Not many reported trouble from dust. In fact, most machines were provided with exhaust systems.

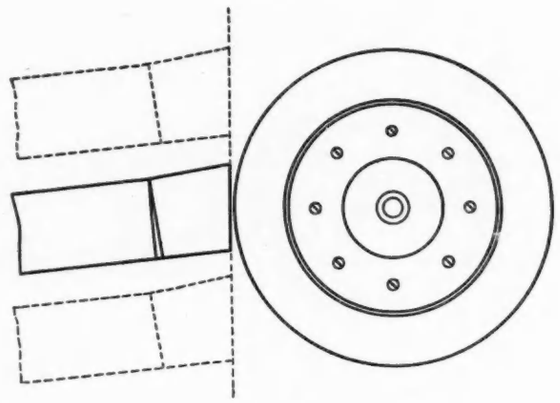


Fig. 4
A recommended method is shown here where the tool is oscillated vertically

One shop foreman stated that the dust did not seem to be objectionable to the operators, but was hard on the surrounding tools and necessitated too frequent repairs to spindles.

As stated before, the cup-shaped wheel was almost universally used except for placing the radius on roughing tools.

Six companies used different wheels for roughing and finishing. These were 60 or 80 H, I, P or S for roughing, and 100 or 120 H, I, P or T for finishing. Table 1 illustrates the lack of uniformity of practice.

In most cases the wheel manufacturers' recommendations were followed. There had been little research on the part of the individual plants. This is to be regretted, for here is an opportunity to improve the practice and reduce grinding costs. The material is so hard that very soft wheels must necessarily be used, causing a great amount of wheel wear. Wheels for tungsten-carbide tools are used up from 10 to 20 times faster than wheels used in grinding high-speed steel. This means that the cost of wheels becomes quite a factor, although many people ignore this fact.

There were, however, two companies who had done some experimenting on their own account. Their findings are interesting. One found that 80 S wheels produced the best results for both roughing and finishing. The other determined that 60 S was best for roughing, and no further finish was required except that the tools were afterward lapped.

This was the only case where all tools were lapped. The machine used was made by themselves, and the lapping compound used was diamond dust. All of the others did not lapping at all or lapped only such tools as those used for piston grooving, where the size had to be maintained within 0.0001 in. Honing was practiced only where it was desired to smooth the radius on roughing tools after grinding by hand.

Those that made a good job of the grinding usually took from 20 min. to an hour or more for a tool about ¾ by ¾ in. section. This may seem long, but the material was so hard that it could not be forced without producing a poor job.

One man in charge of grinding stated that in the early days of tungsten-carbide he found frequent interruptions in manufacturing attributable directly to poorly ground tools. This led to a revision of grinding practice, and he found that by using care with particular reference to the quality of the cutting edge, and maintenance of angles, the difficulties and delays due to grinding were entirely eliminated.

In general the attitude was to disregard the time consumed in grinding and to make a good job no matter how long it takes. This is well enough in the early stages of experiment with a material of this kind, but if not changed will prove to be a serious handicap, as the use of tungsten-carbide is extended to include all the applications on which the material should be used.

Milling cutters, of course, required a still longer time. Two typical examples of resharpening were 9-in. diameter, 24 blades, 1½ hr., and 12-in. diameter, 36 blades, 3 hr.

About 40 per cent of the firms carefully inspected the tools after grinding as they were impressed with the importance of having a keen cutting edge and of maintaining the proper clearance and rake angles. The remainder made no inspection or only a casual one.

When this material was first introduced, William Sellers & Co., Inc., did considerable research on the possible means of grinding lathe and planer tools. They found that tools could be ground on the side of a disk wheel or on the face of a cup wheel, as in Fig. 2, but it was very much better to grind on the periphery, provided—and this is the important point—that the tool is not held against the wheel but is oscillated vertically in a plane across the wheel so that there is a line contact between the wheel and the tool. If the tool be held against the wheel, as in Fig. 3, it becomes concave, producing excessive clearance just under the cutting edge, a condition that is fatal to tungsten-carbide. The latter must have the minimum amount of clearance to provide sufficient support to the edge in contact with the work.

To produce the proper clearance with the peripheral method it is essential to provide a rigid wheel mounting and a substantial tool holder to eliminate any springing under grinding pressure.

The surface grinder where a plain wheel is used

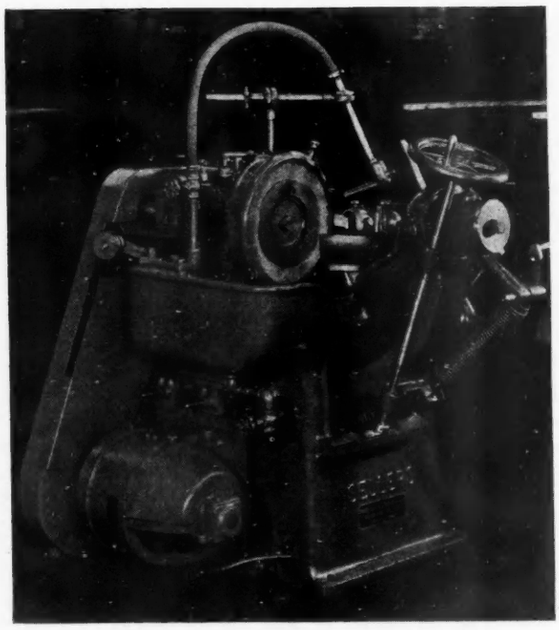


Fig. 5
This Sellers machine grinds on the periphery of the wheel and has a quick method of setting the tool

and the grinding is done on the periphery, employs the above-described principles. However, the surface grinder is not well adapted to a large supply of water, as it will be thrown upward and away from the machine. Furthermore, the setup of the tool is slow and the fixtures required are cumbersome and expensive, and are likely to be none too rigid.

A machine which employs this principle and which is suitable for tools is illustrated in Fig. 5. It grinds on the periphery of the wheel and is arranged with a quick method of setting the tools. A large quantity of water at low velocity is supplied right to the line of contact.

A machine of this type permits the use of a single wheel for roughing and finishing. The action is such that a coarse wheel is not required for rapid grinding, and a fine wheel is not required to produce a fine finish. It has been found that a medium wheel such as 80 H or S will produce the desired result and the necessity for double setting is eliminated.

A further advantage will be found in the elimination of the necessity of lapping.

The outstanding impression gained from this survey is that there is a lack of uniformity of practice in handling tungsten-carbide tools, although there has been a great improvement in the past year and a half. The possibility for further improvement seems to be along at least two lines.

In the first place, the establishing, through research, if necessary, of correct angles of rake and clearance and shape of the nose of the tool. It will also be necessary to carefully maintain these standards.

The other direction of needed improvement is in the time of grinding.

The following recommendations are based on the survey conducted for this article, supplemented by the writer's experience with tungsten-carbide tools.

1. All tools should be ground in a central tool-grinding department by a man or men detailed to handle tungsten-carbide and under competent supervision.

2. All tools should be issued from the tool crib, and all tools returned should be sent to the grinding department before being replaced into stock.

3. Where tools are not giving satisfaction or an excessive amount of tools are used, the tool engineer or some other official designated should make a detailed investigation and the necessary corrections made or the tool taken off of the particular operation.

4. Special equipment designed for the purpose should be purchased for use in grinding tungsten-carbide tools. It is not likely that satisfactory results will be obtained from using grinding machines designed for high-speed tool steel. The requirements are entirely different and a grinder that gives good results on the older materials will not necessarily work well with tungsten-carbide.

5. Use the correct grade and grain of wheel. This will vary with the type of grinding machine used. The more rigid the machine, the better the finish that will be obtained with a given wheel.

6. Use great care in grinding tungsten-carbide to maintain the correct angles of clearance and rake. The engineering or tool department should set standards depending on the material and the operation, and these should be rigidly adhered to. The surfaces should be smooth and the cutting edge reasonably sharp and free from nicks.

7. It is preferable to grind with water, provided the grinding machines are suitable for its use on account of the greater safety to the tool, greater speed of grinding and the other advantages discussed above.

8. Lapping is not necessary except where the tolerance allowed in dimensions of tool is not more than 0.0002 in.

9. Honing is necessary only where the grinding operation has left undesirable lines or wheel marks.

10. Tools should be carefully inspected before leaving the grinding department.

11. Do not permit the machine tool operators to grind their own tools.

12. Whatever other method is used, do not permit "off-hand" grinding of tungsten-carbide tools where the operator attempts to hold the tool in his hand at the proper angle. Not one man in a hundred can duplicate angles by this method.

In closing, the writer wishes to thank the representatives of the various companies who so kindly furnished the information on present methods and equipment. The plants reported on included those of Cadillac Motor Car Co., Chrysler Motor Car Co., Dodge Motor Car Co., General Motors Research Laboratory, Oakland Motor Car Co., Packard Motor Car Co., Timken Detroit Axle Co., and others who specifically requested their names to be withheld.

Improvements in Conveyors

(Continued from page 585)

loads to be carried and the long baking period, but the results have been very satisfactory.

One of the most difficult problems in machine shops has been the disposition of steel turnings and borings. Modern installations now include wide overlapping steel apron conveyors for the collection of turnings in the shop, crushers or disintegrators for cutting turnings into small pieces, wringers or centrifugal machines for extracting the oil, and storage bins adjacent to railroad sidings for accumulation and shipment. In addition to the economical conveying methods now used, there is a distinct profit to the manufacturer in the saving of oil and the higher price received for the crushed material.

The extended use of copper, nickel, and chrome plating has brought into recent use automatic conveying equipment for the transportation of parts through cleaning, rinsing, and electro plating tanks. The tanks, themselves, have been greatly improved by the recent use of lead and rubber lined steel, where wood was formerly used, to resist corrosion.

The design of conveyors in general, including both power conveyors and gravity carriers, has shown a tendency toward the greater use of high carbon heat-treated steels, drop forgings, and precision anti-friction bearings fully inclosed and sealed. Drive mechanisms are more compact with fully inclosed, anti-friction speed reducers and speed changes. This construction is valuable both for maintenance and safety.

Necessity has always been the mother of invention and when the further development of the automotive industry requires new and improved methods of transportation, the conveyor engineers and manufacturers will, undoubtedly, rise to the occasion.

Replacement Fund and Depreciation Account

(Continued from page 573)

The most common idea of the "Depreciation" account is that it is merely a book entry that comes in quite handy for reducing taxes, or for adjusting the profit showing, or for other similar reasons. Consequently, there is no "Replacement Fund" available for use at any time, and the production staff of most businesses are never allowed to do the best job of cost reduction of which they are capable.

Very few companies have a consistent equipment replacement policy. Fundamentally the lack of such policy traces back to wrong views of depreciation held by the financial controllers of manufacturing concerns. Because of these wrong views they do not set up "Replacement Funds," and their companies have no available cash to spend on better equipment in times like these, when improved equipment is most needed for cost reduction, and when the production staff can install it with the most convenience.

Because of these wrong views, the interests of the stockholders of these companies are not as well guarded as they should be. The companies' present costs are too high, and their profits are too low, because their equipment is too inefficient. Their employees are discouraged by the management's own lack of foresight, especially if the employees' wages are cut to make a showing of profit. So the costs go still higher, and the profits still lower on that account.

To climax the troubles, it is almost certain that they have some competitor who has been shrewd enough to recognize the wisdom of the contrary policy. As Andrew Carnegie did, that competitor has laid out a consistent policy of replacing out-of-date equipment at favorable times, and has set aside the funds necessary to carry out the policy. Then as Carnegie always was ready when the next period of activity followed a slump, the forehanded competitor is ready for it. He will be filling orders at a better profit, and with greater despatch, while the business laggard will be turning out product at too high a cost, frantically calling on the equipment builders for deliveries, and struggling to install the equipment after delivery during the boom's rush for product.

It is this defect in managerial foresight that has always made the equipment industries fluctuate as widely as they do in operation. It makes for relatively more present unemployment today in those industries which use equipment. It compels the equipment industries to build plants large enough to care for peak loads thrust upon them by the "boom buyers." It compels the equipment builders to pass on to all their customers the high costs of carrying these peak load plants over long periods of idleness, if they are to stay in business, and to supply equipment when their customers, big and little, come along with boom orders.

So this policy is bad all around; bad for the stockholders of the user concerns, bad for their employees, and bad for the public in making high costs, both of product and equipment. Traced back to its source, the responsibility for this bad policy rests squarely on the shoulders of those in financial control of large and small concerns who do not set up a replacement policy, and do not back it up with a "Replacement Fund."

Electrochemistry in the Automotive Industry

(Continued from page 579)

Chromium plating is one of the most important finishes in the automotive industry. The bright plating process has been patented by Fink.*

Fink and Jones† described some experimental investigations in tungsten plating at the spring meeting of the society. A beautiful coating of silver white metal was obtained with a bath of sodium hydroxide, sodium tungstate, and dextrose, heated to 80 deg. C. or above. According to the authors, "the tungsten deposit is smooth, hard and coherent, having a high luster. Like chromium, the electro-deposited tungsten needs no polishing if the plated article was previously polished. Tungsten has remarkable acid-resisting properties, which make it desirable as a protective coating for other metals. Several types of solutions have been investigated in regard to their usefulness as tungsten plating baths. Solutions of tungsten salts in organic solvents were found unsuitable for this purpose. Aqueous solutions of an acid nature did not give satisfactory metal deposits. Alkaline solutions containing alkaline tungstates were preferably used as plating baths. The temperature, cathode current density, and hydrogen ion concentration of the solution must be controlled. Alloys of tungsten and iron, and of tungsten and nickel, were electrodeposited from similar solutions containing very small concentrations of the ions of these second metals. The usefulness of highly alkaline solution as plating baths for the electrodeposition of other metals is pointed out."

Last year saw the announcement of a new process of cleaning metal electrolytically. This was first announced in *Automotive Industries*, April 19, 1930. Metal parts may be immersed directly in the bath and all scale, rust, oil, and other coatings removed rapidly and economically. The chief advantages of the process are:

1. No pitting.
2. No residual rust or scale.
3. No hydrogen embrittlement.

Progress in the art and science of electrochemistry is coming so fast that still greater achievements are in the offing. The electric furnace has rapidly found its place in foundry work for the production of irons, malleables, etc. In the electroplating field of particular interest are the processes recently developed for the deposition of alloys such as nickel-cobalt, nickel-copper, cadmium-zinc and others.

*U. S. Patent No. 1,802,463, issued April 28, 1931, to Colin G. Fink assigned to United Chromium, Inc.

†The Electrodeposition of Tungsten From Aqueous Solutions, by Colin G. Fink and F. L. Jones.

Welding Effects Economies In Construction of Jigs

by W. Spraragen
Technical Secretary,
American Welding Society

THE applications of the various welding processes in the automotive industry have increased rapidly during the past few years. This has been brought about largely through a desire to reduce production cost.

An outstanding example is the wide application made in the use of spot, butt and flash welding in the manufacture of the Ford car. Castings have been largely replaced. Sheet steel is rolled into tubing flash, butt or seam welded, and then flash welded to suitable forgings. In this way a stamping and a forging are united to form such parts as rear axle shaft housings, differential housings, hand brakes, mufflers, steering gears, fan assemblies, etc. Automobile wheels are now largerly a welded product by a series of operations which are synonymous with mass production.

All-steel automobile bodies are almost universally fabricated by welding.

During the past year the Bureau of Standards, in cooperation with the American Bureau of Welding, completed an investigation on the strength of welded joints in tubular members for aircraft, and this was published as Report No. 348 of the National Advisory Committee of Aeronautics. This fundamental research was undertaken to provide the aircraft industry with information on the strength, weight and cost of a variety of typical welded aircraft joints. The data obtained will be of great value to the designer as well as the production department.

The almost universal use of oxy-acetylene welding for the fabrication of fuselages and other parts from mild steel and chrome-molybdenum tubing is being supplemented by the welding of other alloy steel structures such as wing beams, tail surfaces and landing gear which are heat-treated after welding. Other recent developments include the welding of strong aluminum alloys and an increasing use of welded chrome-nickel steels for parts where corrosion resistance is important, such as exhaust stacks and collector rings.

Manufacturers of equipment have made a greater proportion of their machinery of welded construction during the past year than ever before. One phase of this construction which has been received with particular interest from the welding standpoint is that of constructing jigs, fixtures and special shop machine tools by the welding process where it has proved to be of great economic advantage not only from a first cost standpoint but from the standpoint of being able to tool up much more quickly than where cast structures are used.

During the year the use of automatic shape-cutting machines for the production of special shapes in steel plate, slabs, forgings, etc., rapidly increased. Shape-cut steel parts are now supplied to order by several large steel distributing organizations, and a number of shops specialize in the production of shape-cut steel as well as of finished products made from shape-cut parts.

There has also been a marked increase in the welding of aluminum alloys, particularly the strong alloys designated 17S, 25S and 51S. Among the more important welded products fabricated from the strong aluminum alloys are: Motor truck bodies, gasoline truck tanks, window sash, window screen frames and roof structures.

Of general interest to the automotive industries is the remarkable progress made in the welding of steel structures. There are already in existence a large number of welded structures, a few of ten or more stories in height and one of nineteen stories.

New and better automatic and semi-automatic arc welding equipment have been perfected for use with and without shielding gases and utilizing both the metal arc and carbon arc. Manual operated arc welding machines have been perfected so as to eliminate initial surge of currents and reduce the "time of recovery."

New rivet cutting tips which dissolve a riveted head in 8 or 10 seconds have been perfected. In the machine cutting field there has been an improvement of the multiple torch cutting machine which provides control of all torches from a single station. Light portable complete welding outfits have been perfected to be carried by airplanes so that repairs may be made in the field. Of especial interest to the automotive industries has been the development in the last year of projection welders that require over 3000 KVA power to operate them. Some of the projection welders will make as many as 24 projections at one time and require 60,000 lb. of pressure to mash down the projections. In other words, the work is done in 1/24th of the time that it formerly took to spot weld these one spot at a time.

New Cutting Tools Spur Improvements on Milling Machines

PROGRESS in milling machine design and milling practice during the last year probably has been greater than that in any like period in the history of the art. We are now in the midst of a periodic upheaval—this one being largely due to the introduction of tungsten-carbide tools.

Many refinements have been worked out in connection with standard and semi-standard manufacturing machines, which have resulted in a more complete automatic operation of the machine, safety for the operator, and more convenient operation of all manual controls. Perhaps one of the most important of these is the remarkable advance in the design of fixtures for production. The aim of designers is to make the fixtures quick-acting, rugged, simple and comparatively low in cost. We have seen a large number of these fixtures in action this year. They certainly live up to the most optimistic claims.

It became evident about two years ago that tungsten-carbide would ultimately prove successful as a material for milling cutters. Cutters tipped with tungsten-carbide have now definitely proved themselves successful and highly profitable for milling practically all the structural materials excepting steel. The introduction of tantalum-carbide and tantalum rich tungsten-carbide apparently indicates that steels may be included in this list.

To properly utilize tungsten and tantalum-carbide tipped milling cutters, milling machines must have much greater rigidity, a greatly increased speed range and a broader feed range. The introduction of machines of both the production type, and the column-and-knee type, fulfilling the above requirements, marks a great forward step in machine development.

Machines are now on the market having the required rigidity for tungsten-carbide operation, having spindle speeds with a range as high as 100 to 1 in one make giving speeds from 15 to 1500 r.p.m., and with a range of feeds of 240 to 1 giving feeds from ¼ in. to 60 in. per minute. Other machines of the production type have spindle speeds up to 1000 r.p.m., and feeds up to 100 in. per minute.

A two-piece arbor support has been introduced by one manufacturer making it possible to remove the arbor from the machine with all its cutters intact, saving a vast amount of set-up time. On production jobs, duplicate gangs of cutters and arbors can be used so that one can be in operation while the other set is being ground, reducing the down time of the machine to the very minimum. In manufacturing jobs having small lot production, the cutters may be placed on an arbor and adjusted correctly on the bench while the machine is in operation on other work, thus greatly reducing the length of time a machine is stopped for set-up.

A universal milling machine has been introduced, having a dividing head which, together with its driving mechanism for spiral cutting, marks what is probably the only important advance made in dividing heads and spiral drive mechanism in over 50 years. The spindle of the dividing head is exceptionally large in diameter, mounted on preloaded ball bearings to prevent spindle float and insure greater accuracy and much greater permanence to the accuracy. The spindle is driven by a hypoid bevel gear having a 5 to 1 ratio instead of the customary 40 to 1, thus reducing the indexing time to one-eighth the previous indexing time. The dividing head indexes all consecutive numbers up to 500, and has change gears and driving mechanism to cut over 40,000 different leads.

Fixture design, particularly for high production milling machines, has changed rather rapidly in the last year.

One well known line features important improvements some of which are listed below.

(a) A shroud has been provided for covering the cutters protecting the operator while loading or unloading the fixtures. The piece of work can be milled without moving the shroud.

(b) Automatic control of cutter lubricant by use of cams along side of the table.

(c) Double head machine—with independent spindle drive permitting both spindles to cut down when using a reciprocating cycle. Individual motors are used for driving the spindles, these being mounted in the base of the headstock, that is, a special motor compartment at the bottom of the headstock.

(d) Hydraulically operated rise and fall spindle carriers which allow the cutters to rise and fall depending upon the nature of the contour being milled.

(e) Sliding spindle carriers with quill adjustment for milling around obstructions such as inlet flange of a cylinder head. The carriers are operated hydraulically and guide the cutters automatically around the obstructing flange.

Considerable activity is found in the development of hydraulic mechanisms.

To sum up, we may say that the new machines recently introduced will do a greater variety of work, take less time to set up, are more convenient to operate, finish the work better and quicker, and at the same time have greater safety for the operator and are simple and readily accessible for maintenance.

R

High Precision and Speed on Gear Cutters Demanded by New Transmissions

RECENT developments in transmission design due to popular demand for quiet, easy shifting mechanisms have brought about some revolutionary changes in the methods of gear cutting, finishing, and control. In consequence, the past year or so has seen an unusual activity in the gear industry resulting in the introduction of new and improved production equipment. The general tendency has been toward higher production rates, and hydraulic feeds on some makes. But the greatest emphasis has been placed on precision and the maintenance of close tolerances.

Among the equipment brought out during this period are the following manufacturing machines: spur, helical, and worm-grinding machines; gear tooth burnishers and burnishing gears; gear lapping machines; tooth chamfering machine; and measuring and testing devices for lead, spacing and profile. Thus the equipment industry has made available to the production executive, the tools for economically building the latest products of the automotive designer's art.

Building quiet gear sets is no simple problem. Freewheeling, synchro-mesh designs, and the substitution of helical and herringbone gears for spur gears, all point to this objective. Some of these designs have introduced new manufacturing problems which are met by the equipment discussed here. However, it is recognized that the outstanding need is for accurately cut gears with finest possible manufacturing tolerances on profile, spacing, diameters, and lead in the case of worm and helical gearing. Incidentally, it has been a rather common experience that even the finest built gear sets may be noisy due to the effect of vibration set up by other units. Much of this has been eliminated today through rubber cushioning.

Small but measurable errors arising from distortion in heat treating are responsible for the marked activity in the field of finishing machines. A variety of lapping, burnishing, and grinding machines are now available for this purpose. Probably one of the outstanding examples is a line of grinding machines just placed on the market. In principle, the object of the process is to produce a theoretically perfect gear with a mathematically true involute profile. This is accomplished by using a grinding wheel with straight sides and top corresponding with the shape of a tooth in a master rack. The wheel is oscillated by means of reciprocating ram at a predetermined speed.

The interesting feature of the machine is the claim that grinding at production rates comparable with any other method, it will finish the tooth profile and spacing accurately within 0.0002 in. This principle has been extended to machines for grinding spur, helical, and worm gears.

In answer to current transmission gear requirements, an interesting tooth chamfering machine has been designed for chamfering and intermittently cutting or recessing gear teeth. It is also arranged to chamfer or round all internal or external teeth after recessing. A recent improvement is the addition of an independently driven geared head providing greater flexibility and reducing loading and unloading time.

One of the lapping machines is built on an entirely new principle. A spiral lap is used for spur gears while a spur lap is used for spirals. To spread the lapping action across the face of the gear, the gear is reciprocated throughout the operation. Normal finishing time for a transmission gear is said to be about 3 to 5 minutes. A real high production rougher for spiral bevel gears recently was added by a maker of spiral gear generators. This is a hydraulically operated machine fully automatic in action. It is designed specifically for high production rates.

Obviously, quality control is a vital requisite of the new order. And as a matter of fact, inspection and control devices have closely paralleled the advances in machine design. Some measuring and testing devices automatically record the errors in gears and at the same time indicate their location and magnitude.

One testing machine is made to check the accuracy of the spiral angle of helical gears. A rack tooth gage is inserted between the teeth in exact alignment with the axis of the gear. A sine bar is attached to the rear of the gage to measure the spiral angle by means of blocks.

In the manufacture of worm gearing, one company has developed a testing device which checks tooth spacing and lead to an accuracy of 0.0002 in. Another machine in the same plant gives precise measurements of tooth thickness, pitch, diameter, and pressure angle. There is a possibility that at least one of these machines may be placed on the market in the near future.

Looking over the recent advances in the gear industry, one is greatly impressed by the importance of the new machines in today's production planning. With the emphasis on quietness which is concomitant with precision, production costs would be prohibitive if the new processes were not immediately available.

The Obsolete Plant Gradually Ceases to Produce Profits

by W. H. Rastall
Chief, Industrial Machinery Division
Department of Commerce

WHEN the time comes to buy equipment, how is it done? When a question arises as to the adequacy of a given machine for a given job, how is a decision reached? Does the mechanic, shop foreman or shop superintendent make an earnest effort to secure better equipment, only to be turned down by the strong-armed methods of a hard-boiled treasurer, or is there really a company policy regarding equipment? How should machinery be purchased? Experience in many industries suggests that heretofore American industry has had equipment anarchy rather than a definite equipment policy.

Dr. Julius Klein
Copyright Harris & Ewing

THERE is no denying the fact that as a general rule industry has been looking after its equipment needs in a completely casual, haphazard fashion—as though this vital problem were but an incidental matter to be taken up at odd times with any resources not at the moment committed to some other purpose. This has contributed no small part to our present industrial woes. Unquestionably the time has come when American industry should abandon this dangerous nonchalance and arrive at a definite equipment policy. Whether that takes the form of a replacement sinking fund or some other equally sensible device depends largely upon the needs and abilities of the given firm. But in any case the experiences of the recent past show all too clearly the need for most serious consideration of our industrial practice in this important aspect.

JULIUS KLEIN
Assistant Secretary of Commerce.

These problems are not nearly so acute when equipment is purchased for new establishments as is the case when replacements are involved. Progress is so rapid these days that the production shop should probably challenge the continued operation of any machine over ten years old. Management should satisfy itself that it is still safe from the point of view of competitive costs to continue to operate a machine designed in an earlier decade. Instead we seem to have a policy which puts off the evil day. Management does not replace equipment until there is an urgent demand. The treasurer is perhaps anxious to conserve his resources, to carry on without expenditure this year, in the hope that things will be better next year, yet all too frequently such a policy proves to be a hideous mistake, for this is the path that ensnares business in the insidious web of obsolescence—an evil that easily takes an enterprise unawares with fatal consequences.

The Westinghouse Electric & Mfg. Co. developed a definite equipment policy under which they made a survey of each machine on their inventory, and were surprised to discover 114 machines taking up floor space unnecessarily because they were not needed. In the majority of cases these machines were scrapped. The application of method, a definite policy as contrasted to one of drift, resulted in substantial savings and at the same time insured the enterprise against the hazards of obsolescence. Management there now controls the condition of its equipment on the basis of a definite policy instead of ducking an embarrassing subject, strong-arm style.

The equipment question also runs afoul of mob psychology. In times like these it is almost impossible to sell industrial machinery. At the other extreme, at the peak of a boom, buyers run over each other in their efforts to get equipment. Economists have long preached that there is a very important connection between the business cycle and the equipment industries. Each depression appears to teach us a lesson, and indication suggests that one of the important things we are learning from

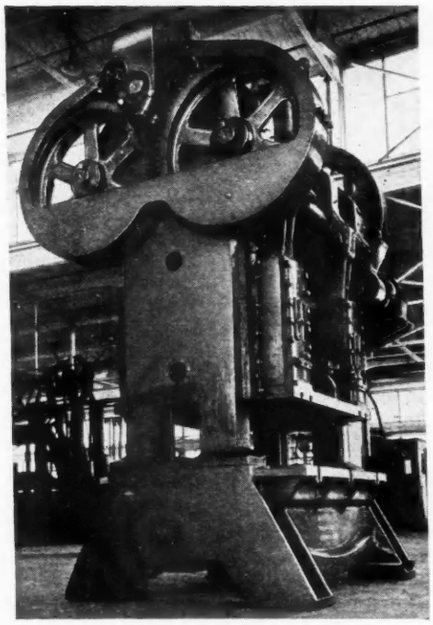
(Turn to page 632, please)

Machine Tools and Shop Equipment Announced for 1932

In the absence of a Machine Tool and Equipment Show this year, Automotive Industries takes pleasure in offering its own display of new tools + + + + + +

Marquette Four-Point Power Press

In the Marquette four-point power press, manufactured by the Marquette Tool & Mfg. Co., Chicago, Ill., pressure is applied to the press slide at four points. This tool was introduced some time ago and is in use in a number of body shops. Two parallel crankshafts are employed, with



four connection screws, one to each corner of the slide. Having four points of pressure application the slide always remains parallel with the press bed, even if a die of irregular shape is placed off-center on the bed.

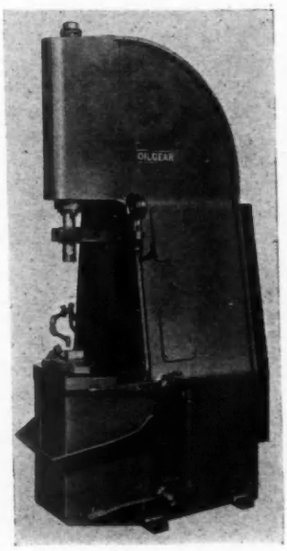
The accompanying illustration shows the press in use in the plant of a Detroit body manufacturer cutting louvers in an engine hood. The manufacturer of the press has been informed that more than one million pieces have been produced without regrinding the die, and he claims this was made possible only by perfect registering of the punch and die, due to the parallel motion of the slide relative to the bed. The arrangement of the gearing is said to be such that the driving load is equally divided between the two shafts.

These presses are furnished either with the standard bed, or, if desired, with a Marquette cushion bed having blankholding cushions built in it. The presses are manufactured in a range of sizes and are also built to suit specifications as required. A larger, double-crank, four-point power press is in course of development at the present time.

Oilgear Streamline Press

Various sizes of Streamline presses have been added recently to the line of the Oilgear Co., Milwaukee, Wis. The entire operating mechanism of these presses, including the Oilgear pump, electric motor, lubricant pump, piping and control, is enclosed in the frame structure. Equipped with either variable-delivery, constant-pressure, or constant displacement Oilgear pumps and suitable controls, these presses are said to be specially adapted for assembling, broaching, forcing and general manufacturing operations.

The illustration shows the front and side elevation of a 6-ton Streamline press. The press frame is a one-piece heavy weight welded steel structure. A welded steel guard covers the rear portion of the frame. The press cylinder tube is honed, the piston and piston rings are fitted in place, while the ground and polished ram is guided in the front head. Molded ram packing is used. A direct reading pressure gage registers the working pressure.



Both hand and foot control, either semi-automatic or full automatic, is furnished as standard equipment with either type of Oilgear pump. When using a variable delivery pump and semi-automatic control, any required ram speed,

Machine Tools and Shop Equipment Announced for 1932

within the capacity of the machine, can be obtained by means of the lever or pedal at the will of the operator.

The ram can be started or reversed instantly. Controls are arranged with adjustable stroke limiting dogs. The full-automatic control permits continuous ram motion through any desired stroke.

When using a constant-pressure pump the press ram can be stalled and maximum pressure held continuously without overheating and loss of power, it is claimed. Ram speed can be varied to suit by means of an external adjusting screw. When using a constant displacement pump the ram speed is constant while the top and bottom limits of ram travel are adjustable. The cycle of operation can be interrupted at will by hand or foot.

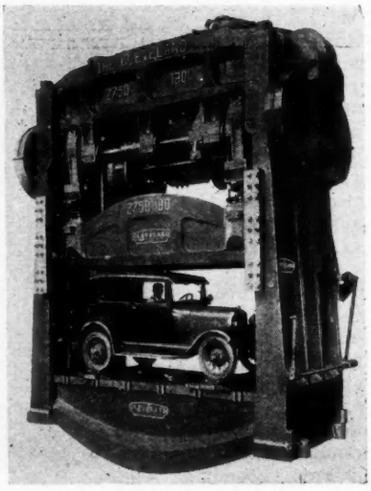
Oilgear Streamline presses are manufactured in capacities of 2½, 3½, 6, 10 and 15 tons. The general specifications of these machines are: Stroke, 18 in.; daylight, 24 in.; depth of throat, 8 in.; size of platen, 10 by 13 in.; hole in platen, 4 in. diameter; height of platen from floor, 20½ in.; total height, 102 in.; floor space, 35½ by 43 in.; net weight, 4100 lb.

Cleveland Four-Crank Press

The Cleveland Punch & Shear Works Co., Cleveland, Ohio, recently delivered to one of the leading automobile manufacturers what is said to be the largest press of its type ever built, weighing approximately 500,000 lb.

Instead of the customary single shaft with only two cranks, located in the center of the slide, this Cleveland press is provided with twin shafts and has four cranks which are located at the corners of the slide. This design eliminates any tendency of the slide to rock when taking its maximum load, and assures continuous accuracy, as equal pressure is always exerted on all four cranks. There is also embodied in this machine a novel design which permits adjustment of the slide up to approximately 24 in.

As will be seen from the illustration, the bed area is sufficiently large to accommodate a completely finished automobile. The bed casting is made of steel and weighs 103,000 lb., having an overall length of 220 in., while the flywheel alone weighs 5 tons.

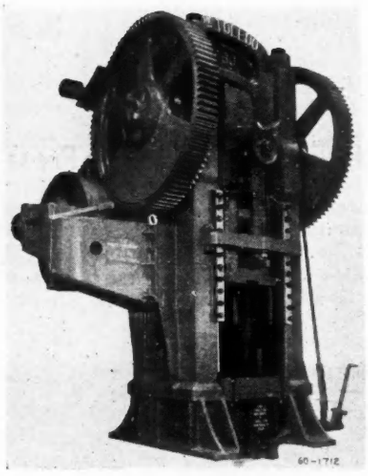


One of the outstanding features of this Cleveland press is that instead of the customary four steel tie rods, combining the crown, bed and uprights into one complete unit, it has eight, four on each side. Bed, crown and uprights are of massive design.

"Toledo" Press for Automobile Work

The illustration shows a large single crank straight column press recently built by the Toledo Machine & Tool Co., Toledo, Ohio, for operating dies used in the manufacture of such articles as brake drums, brake disk covers and disk wheels.

The crankshaft is of the semi-eccentric type, of large diameter, heat-treated, normalized, and capable of exerting a pressure of about 1200 tons at the bottom of the stroke, which is 20 in. The shut height on the bed is 36 in., and the thickness of the bolster plate is 12 in.,



measuring 54 in. front to back by 46 in. right to left. The total weight of the press is about 200,000 lb.

Aside from size the machine embodies all of the most advanced ideas in press construction. The main gears are of steel castings. The bearings are bronze-bushed, except that the driveshaft is fitted with roller bearings. There are also roller bearings in the flywheel, which is the only part in motion when the press is at rest. This press is controlled by the Toledo improved multiple-disk friction clutch built into the flywheel, with independent brake. The hand lever shown is fitted with a positive stop, which permits of continuous running, or with slight adjustment it will automatically stop the press at the top center.

A power slide elevator, fitted with safety device, is used for raising and lowering the slide. It is operated by a motor mounted directly in back of the small gear in the center of the front view of the press, and geared to same by a rawhide pinion. A 75 hp. motor, mounted at the top of one of the uprights and belted direct to the flywheel, furnishes the necessary power.

Federal Press

Federal Press Co., Elkhart, Ind., manufactures a line of open-back inclinable presses up to 80 tons capacity, and a line of semi-automatic and automatic feeding devices.

One of the features of the presses is a non-repeat clutch mechanism. This mechanism is said to be very simple, so that it is possible to change from a single action to a continuous action press without removing screws or bolts. Another feature is a new type of quick-adjusting knockout bracket, which saves time in set up. Timken roller

bearings are now used in the flywheels, which results in a saving in power and eliminates the old wheel-bearing bugaboo.

In the back-geared presses the bracket for the back-gear shaft is now cast integral with the press frame. The back-gear shaft is now mounted on two roller bearings, which are of the adjustable type and permit of maintaining the alignment of the gear train.

The Federal dial feed is cam-actuated. This feed is said to index positively at all speeds, to lock in place absolutely throughout the cycle, and to be capable of indexing to any degree of accuracy. The change from one job to another is said to be as quick as with any standard set-up.

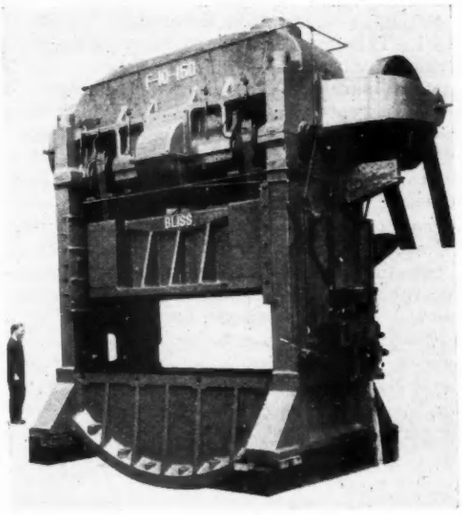
These dial feeds can be adapted to punch presses of all makes.

Bliss Four-Crank Press

The larger dies used in automotive body work are usually unsymmetrical. This often puts the center of pressure well away from the center of the press which, in the ordinary double crank press, is unimportant as long as the center of pressure lies near the vertical plane of the shaft. However, when the center of pressure is far from this plane, off center in a front to back direction, heavy loads are imposed on the slide gibs, and difficulties experienced with the dies and wear of the slide and gibs.

An improved press to meet this condition has been designed and built by the E. W. Bliss Co. of Brooklyn, N. Y., and is illustrated herewith. It is called a four-crank press (four-point suspension) because it has two double crankshafts which, geared together to revolve in step, distribute the pressure of their four pitmans to the four corners of the slide. By this distribution of effort the gibs are relieved of load due to tilting moments.

The press has a bed area of 70 by 150-in. The crown has a cored box section, with a vertical web over each shaft.



Each shaft thus has its own beam, which is stiffened by connecting flanges and diaphragms. The tie rods pass outside the shafts through broad uprights, and the latter are further stiffened by the absence of cored openings for heating the tie rods, these openings being in the bed.

The pitmans (or connecting rods driving the slide) are non-adjustable. Slide adjustment is affected through four screws attached to the slidable wrist blocks which are fitted to the slide in bored holes. The nuts for the screws are the rotating members and are geared back to an adjusting motor on the slide.

The main gear train is mounted in the middle of the press. It consists of three herringbone gears; a pair of equal-sized gears meshing together connect the shafts, and the rear gear is engaged by the pinion.

Machine Tools and Shop Equipment Announced for 1932

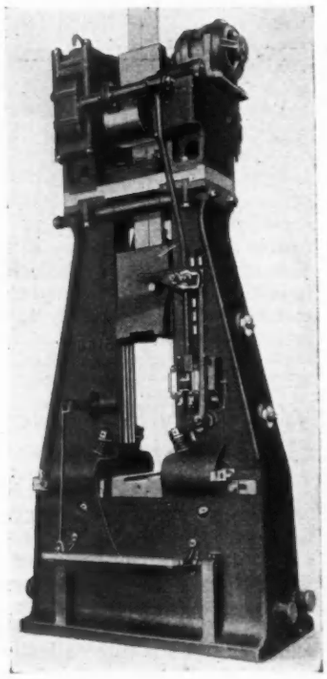
A novelty is the circulating oil system which is built into this press. A motor driven pump takes oil from a supply tank and delivers it under pressure through a filter to a supply main. Sight feed regulators connect the main with every bearing while larger quantities are fed to the two gear trains. A carefully worked out system of oil recovery drains the oil back to the supply tank. An advantage of the motor-driven oil pump is that it may be started early for the purpose of filling all bearings before the press is started.

Following are the principal dimensions of this press: Distance from bed to slide with stroke down and adjustment up, 36-in.; stroke, 10-in.; slide adjustment, 6-in.; area of slide, 60 by 138.5-in.; distance between uprights, 150-in.; net weight, 250,000 lb.

Erie Type M Motor-Driven Drop Hammer

The new Type M motor-driven board drop hammer placed on the market by the Erie Foundry Co., Erie, Pa., is said to be the first board drop hammer specially designed for motor drive. The Erie Foundry Co. believes that motor-driven hammers will become the predominating type before long, and it cites the following advantages over the belt-driven type: The hammer does not have to be located in a fixed relation to the line shaft and can be placed closer to walls and closer to other machines. The elimination of belts and brace rods makes the hammer accessible on all sides for the use of an overhead crane. A saving in power results from the elimination of shafting and belting, and the Type M is said to have a higher production capacity, partly due to steadier operation and partly to the less sluggish action of the hammer.

The motor is mounted on a cast-steel plate which, being pivoted at one end and supported on springs at the other, provides a floating or shock-absorbing action.



By the use of two sets of flexible couplings and a wobbler shaft, the motor is allowed greater amplitude of motion. Shock loads, such as occur when the rolls grip the boards, are cushioned in the couplings and not transmitted to the motor.

All gears in the hammer are cut from alloy steel forgings and heat-treated. All shafts are made of alloy steel, heat-treated, and mounted in ball bearings.

A constant-speed ball-bearing motor of standard make, together with control equipment, is ordinarily furnished

Machine Tools and Shop Equipment Announced for 1932

with the hammer, but the customer may specify the electrical equipment himself. A double reduction drive is used between the motor and the rolls. This does away with the necessity for pinions with an inordinately small number of teeth and also with the necessity for excessive pitchline velocities. All gears are enclosed in a cast-steel gearcase and run in a bath of oil.

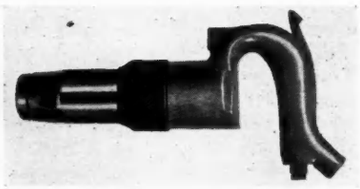
The rolls, which are of exceptionally large diameter, are provided with ventilating openings extending from end to end and are shrunk on the shafts. After mounting the roll on the shaft, the seats for the ball bearings and the outside diameter of the roll are machined in one setting. The entire roll pressure is carried on two bearings, one at each end of the roll. There are two additional bearings on each shaft, one to keep the shaft in alignment and the other to take the gear-tooth load.

The board clamps are machined to a contour developed experimentally to hold the ram securely when suspended, and yet to provide ample clearance so that the ram will drop freely when the clamp is opened. The clamps are carried in a floating head which is free to adjust itself to the boards, preventing the clamps from dragging on them.

Type M Erie drop hammers are built in a range of sizes of from 400 to 4000 lb. inclusive.

Buckeye High-Speed Hammer

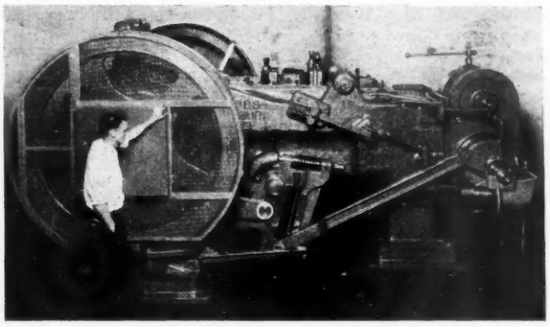
A new type of pneumatic high-speed chipping and light riveting hammer has been announced by the Buckeye Portable Tool Co., Dayton, Ohio. This hammer consists of only three major parts, handle, cylinder and piston—and the one-diameter piston is its only moving part. This



piston serves both the usual function of a piston and also that of a valve. It is claimed that with this hammer there is no tiring recoil or annoying vibration, and that the hammer throttles down nicely for light blows.

Waterbury Farrel Double-Blow Cold Header

The machine illustrated by the photograph herewith was built by the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., for the production of certain automotive parts which previously were produced by another than the cold upsetting process. It is believed to be the largest cold-forging header ever built. This machine weighs 147,000 lb., feeds the metal from either coil or bar and will produce automatically many headed or upset auto-



mobile parts which formerly were hot forged. A conservative capacity rating is 1¼-in. diameter stock; its speed is 40 pieces per minute.

The manufacturer claims that the use of cold heading machines of this type will assure high production, a minimum of scrap and first quality product.

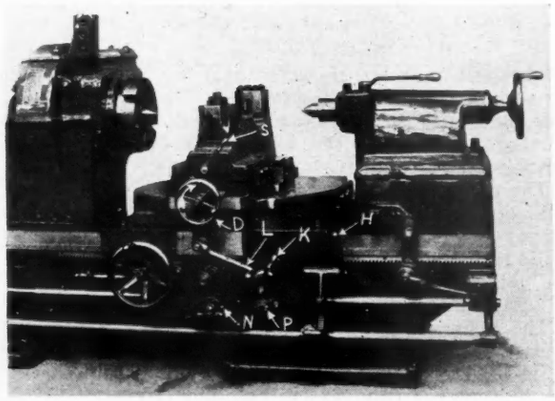
LeBlond Lathe for Spherical Turning

For rough and finish turning spherical surfaces the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, has developed the attachment here illustrated. Of simple construction, the machine is designed for precision work at a maximum rate. The design features rigidity, centralized control, ease of set-up, and a large size range. As shown, the machine is set up for rough and finish turning large spherical bearings which have an intermittent cut and require a very smooth finish.

The attachment is supported on an extra-heavy, plate-type carriage which permits the use of an exceptionally large bearing surface for the tool slide plate. The plate is revolved by a worm gear drive with a reduction ratio of 160 to 1. This is said to give a smooth feed entirely free from torsional vibrations.

The entire operating cycle is controlled from the apron. The lever *H* actuates the multiple disk clutch which starts and stops the spindle. The hand wheel *D*, when revolved in the direction shown, feeds both the front and rear tools into the work; this result is accomplished by using a left-hand thread to actuate the front tool slide and a right-hand thread to actuate the rear tool slide. Lever *N* actuates the positive feed clutch and handle *P* is used to change the direction of the feed. Crank *L* is used to revolve the table back to the starting position after the cut is complete. Speed variations are obtained by handle *K* which actuates a motor controller.

The set-up is very simple, since the rear tool can be set to depth by the cross-feed screw *D*, and the final adjustment for the front finish turning tool can be made by the top slide screw *S* without moving the rear tool. This con-



struction also reduces the time to change from rough to finish cut, since it is only necessary to index the front tool block.

This attachment is designed to take a large range of work and is desirable for spherical work where accuracy and high production are desirable.

Chard Lathes

Western Machine Tool Works, Holland, Mich., recently placed on the market a line of Chard lathes, these lathes being manufactured in sizes from 16 to 28 in. and in three types, viz.: Multi-speed, manufacturing, and engine lathes.

The Chard 12-speed engine or manufacturing lathe has four selective speeds in the speedbox and three in the headstock, making 12 speeds in all. The four highest speeds are transmitted to the spindle directly without passing through any gears in the headstock. The drive from the lower shaft of the speedbox to the spindle is by silent chain or Texropes.

The speedbox contains hardened chrome-nickel-steel gears running in a bath of oil. All its shafts run in ball bearings. The driving gear or pulley on the speedbox runs in a bearing which is part of the speedbox itself, thus relieving the drive shaft of strains. To assure greater rigidity, the speedbox is cast integral with the leg of the lathe. Start and stop levers are conveniently located on the apron and headstock.

The headstock spindle is supported on four Timken bearings, the end thrust of the spindle being taken on the front bearing, while the rear bearing is of the floating type. The spindle and back-gear shaft are made hollow, to provide for the lubrication of moving parts from the inside.

The Chard cone-head headstock is furnished with a back gear and has a brake attachment, which makes it possible to stop the headstock very quickly. The friction clutch is located directly on the spindle and engages with the pulley for starting and stopping the lathe. A shaft extending through the headstock has a set of toggles or bell cranks attached to it which operate two shifter forks in a sliding cone and the brakes. The operating lever on the front of the head, by means of which the lathe is started and stopped, is secured to this shaft.

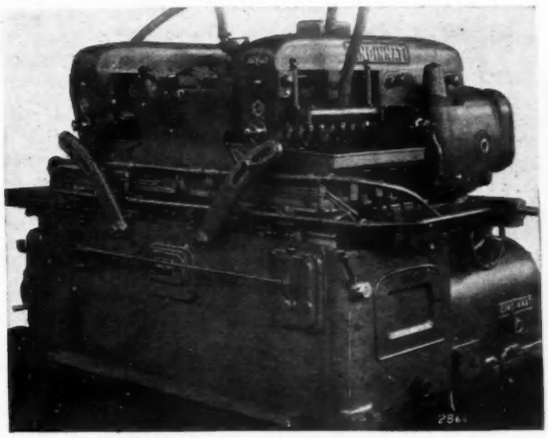
The cone pulley runs free on the sleeve and not on the spindle.

To operate the head with open belt, the operator first disengages the back gear and inserts the plunger pin in the face gear into the hole in the flange of the sleeve. Then, by throwing the lever to the left, the friction clutch is engaged in the pulley. The friction clutch is keyed to the sleeve, and the sleeve engaged to the face gear starts the spindle rotating. In order to stop the spindle, all that is necessary to do is to throw the lever to the right. This disengages the friction clutch and applies the brake shoes to the flange on the sleeve, and thus stops the spindle instantly, leaving the pulley revolving freely on the spindle.

Special Double-Head Plain Hydromatic Milling Machine

The illustration shows this machine, a product of the Cincinnati Milling Machine Co., Cincinnati, Ohio, working on a two-way cycle and tooled for operations on a universal-joint housing. The material of the work is hot rolled steel and the operation consists in straddle-milling the lugs. Sixteen 7-in. high-speed steel cutters with inserted blades are used, eight on each of the two arbors. The speed of the cutters is 37 r.p.m. The depth of stock removed is ⅛ in. and the production is 835 per hour.

The equipment shown by the photograph was designed with the following ideas in mind:



a. To mill lugs on universal joint housings at an unusually high rate of production.

b. To limit operator's duties to removing and loading of universal joints.

c. To take full advantage of the reciprocating cycle.

d. To permit operator to load and unload work from one position.

e. To reduce actual milling time.

f. To reduce actual travel or movement of table to a minimum.

g. To provide fool-proof locating of work piece.

The above was accomplished by using a 4-36 double-head plain hydromatic with reciprocating table-feed cycle. The bed of the machine was lengthened and the table travel is 36 in. Standard No. 4 spindle carriers are mounted on a special headstock having guide ways on both sides. This headstock is mounted on a special cast base which houses the pulley brackets at each end. The 10-hp. motor is mounted in the middle of the base and a chain drive is taken off in both directions through Z pulleys.

The standard spindle carriers have the regular standard quill adjustment and the maximum distance from the spindle centerline of the table can be varied between limits of 5¼ and 16½ in.

The total distance between centerlines of spindles is 49½ in. A special long rectangular overarm is used, which supports the two large gangs of eight 7-in. inserted-tooth, half-side mills mounted on a 2-in. arbor. A special shroud covers each gang of cutters and protects the operator while loading or unloading the fixtures. The piece of work can be milled without moving the shroud.

Two special fixtures are mounted on the center of the machine table. Each fixture has four spindles over which the work pieces are placed, with their lugs toward the cutter gangs. Two plunger-type fingers automatically position the work. Following this the heavy hydraulically-operated clamps move down on the tops of the universal joint housings. The fingers then automatically recede or draw back into the body of the fixture. All moving members of the fixture are actuated hydraulically. Dogs alongside the bed actuate cam plates bolted to the side of the table and thereby control by-pass of the oil which controls fixture movements.

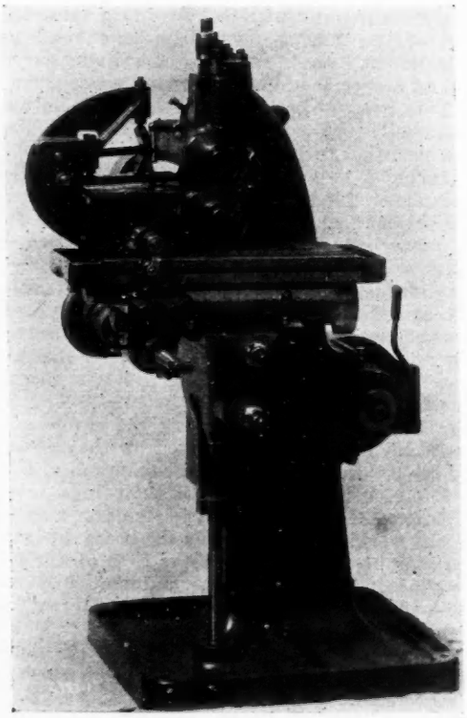
Machine Tools and Shop Equipment Announced for 1932

Double Spindle Automatic Milling Machine

The demand for increased production on hand milling machines led the Superior Machine & Engineering Co., Detroit, Mich., to design a double-spindle milling machine so as to perform two operations simultaneously on a variety of work. The illustration herewith shows this machine with a special fixture for holding piston rings when sawing them apart. The work is clamped and unclamped by the movement of the table. The dwell of the table can be regulated so the operator will have ample time to put the work in place and remove it when finished. The table feed can be disengaged at any time and the table and fixture operated by hand for convenience in setting up a job. Graduated dials are provided for adjusting screws. The machine is also made with a single spindle.

This type of machine allows various designs of fixtures to be used in order to handle the different kinds of work to advantage. The spindle speeds are changed by means of pulleys and the table feed through change of gears. The spindles are hardened and ground and run in bronze bearings in a bath of oil. All gears are of steel and hardened. The main drive and other shafts are mounted on anti-friction bearings.

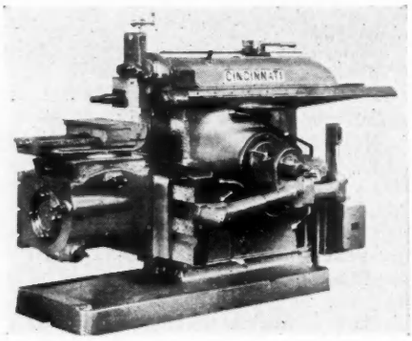
The machine does not require a countershaft, but can be belted direct from the main line, or can be driven by a motor. The main driving pulley is made for a 4 in. belt and is 10 in. in diameter. The weight of the machine is approximately 2000 lb.



Cincinnati Shapers

Three machine tools manufactured by the Cincinnati Shaper Co., Cincinnati, Ohio, are illustrated herewith.

Fig. 1 shows the 24-in. Cincinnati rapid-traverse shaper with universal table. The tilting top of the universal table tilts 15 deg. both upward and downward. The tilting top has a full bearing in the body of the table in all positions. The table revolves about the trunnion shown, which trunnion is cast solid with the apron.



The company also supplies the machine with a plain table. The power rapid traverse is built in, mounted on anti-friction bearings and automatically lubricated. The ramways are solid on both sides. The sliding block is a hardened and ground steel gib on the driving side. The entire shaper is automatically oiled, using the Cincinnati sealed oiling system.

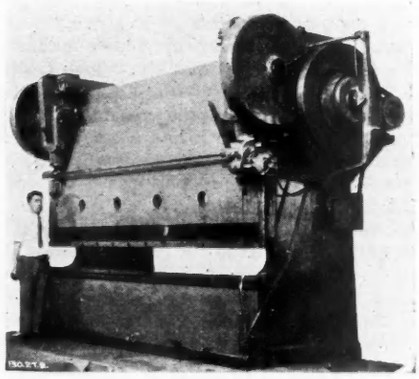


Fig. 2 shows the latest Cincinnati 10-ft. press brake of 5/16-in. capacity. The eccentrics are located in the housings, thus eliminating distortion from eccentric loads. Both bed and ram plates are 60 in. deep. The bed and rams on these machines are guaranteed to stay parallel within 0.005 in. under full rated loads.

Garvin Four-Head Automatic Tapping Machine

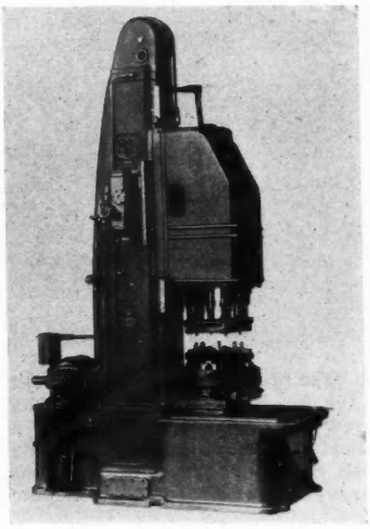
Western Machine Tool Works, Holland, Mich., have brought out a No. 2 four-head model as an addition to its line of Garvin automatic tapping machines. With this equipment it is possible to tap holes of four different sizes. The machine shown, equipped with a four-change speed-box, is used for tapping spindle connecting rod ends, and the jigs used in connection with this work are shown on the table. One of these heads is arranged for left-hand drive, and the heads can be arranged accordingly with any four-head machine.

The machine is equipped with a telescopic screw for raising and lowering the table. Its column is of heavy box section. The table is provided with T-slots for securing work-holding fixtures and with a liberal-sized oil trough. Under the table there is a Y-shaped web forming a knee. The table is secured to the V bearing of the column by means of a screw which pulls a tapered clamp up against the back of the bearing, affording a rigid locking mechanism.

All moving parts of the machine are mounted on Timken roller bearings. All the operator has to do is to pull the starting lever until the tap is engaged in the work; the machine completes the operation automatically, tapping to the exact depth. Each of the four heads has a capacity for driving ¼-in. to ⅞-in. U.S.S. taps in cast iron, or from ¼ in. to ¾ in. in steel. The pipe-tap capacity is ½ in. in cast iron and ⅜ in. in steel.

Natco Hydraulic Driller

The National Automatic Tool Co. of Richmond, Ind., has brought out a new hydraulic driller. It is known as the Natco Model C-12-H machine, and can be provided with either the high or low base as standard equipment. The high base has a working surface of 36 x 29 in., approximately 24 in. above the floor line, and is provided with chip chutes and a clean-out hole in the front of the base for removing the chips. The low base has a working surface of 36 x 32 in., approximately 9¼ in. above the floor line. The low base is intended to be used when



mounting high fixtures or where a box or rotating table is desirable in arranging the set-up.

The inside of the rear section of both bases is used as a reservoir for the hydraulic system. This reservoir can be conveniently filled through an opening located at the right rear of the base. The height of oil is easily noted by swinging the cover away from the top of the funnel and straining device located in this opening.

The column is of the usual box section design, with square ways, and is mounted on the top of the base, held securely with heavy bolts. It is provided with a top housing which carries a double-sheave wheel. On this the cables are mounted connecting the counterweight inside the column to the slide on the face of the column.

This machine is to be used only for fixed center work, and the fixed center cluster heads are mounted in the usual manner on the head slide; they are backed up by a motor housing which takes the major portion of the drilling thrust. The motor used for driving the cluster heads is a vertical side-mounted motor, and space is provided for a range up to and including a 10 hp. motor. The proper alignment and adjustment of the head slide to the column are made by means of set screws.

The pump unit is mounted at the rear of the column on top of the base, the pump being direct-connected to a motor. A motor of 1200 r.p.m. is recommended. With a 3 hp. motor an oil pressure of 200 lb. p. sq. in. can be delivered, while for special cases a 5 hp. motor can be used, which delivers up to 300 lb. p. sq. in. pressure.

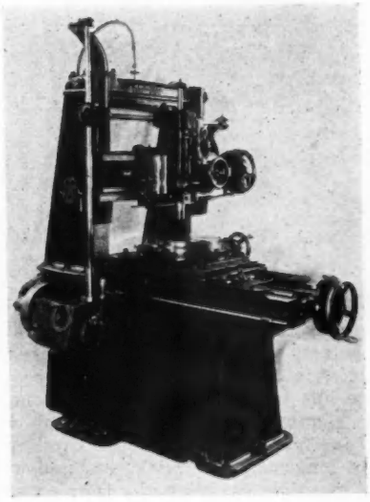
The machine is provided with a 6-in. cylinder providing 18 in. of travel, any portion of which can be used for various feeding rates. The standard Natco box valve mounted on the left side of the column, working in connection with trip dogs on the head slide, controls the movements of the head. Operating the pump at 200 lb. p. sq. in. provides a maximum feeding pressure of 5600 lb.; operating the pump at 300 lb. p. sq. in. for special application provides a maximum feeding pressure of 8000 lb. A feeding rate of 15 in. per minute can obtained. The rapid traverse rate is approximately 80 in. per minute.

The usual feeding cycle on the machine, with standard equipment follows this sequence: Rapid traverse down at approximately 80 lb. p. m., feed at any rate from 0 in. to 15 in. per minute. Rapid up-stroke of approximately 80 in. p. m.—then stop. The operator starts the cycle by merely pulling up on the air valve handle which is located in a convenient position for the operator at the right front corner of the machine. The remainder of the cycle is completely automatic and in case of emergency pushing down the air valve handle will automatically start the head in rapid traverse up. The head will stop in the usual manner at the top of the stroke.

Size 3½ Hauser Jig Boring Machine

Henri Hauser, Ltd., of Bienne, Switzerland, has added the new size 3½ jig boring machine to its line. The new machine, which was shown for the first time at the Leipzig Spring Fair, this year, is marketed in the United States by the Index Machinery Corp., Cincinnati, Ohio.

One of the innovations of the new model is a device whereby perfect alignment between the cross rail of the machine, the boring spindle and the table is claimed to



Machine Tools and Shop Equipment Announced for 1932

be maintained at all times. This consists of a series of hardened, ground locating blocks fastened to the two upright housings of the machine, upon which rest suitable arms, fastened to the cross rail, which take the weight off the elevating screws.

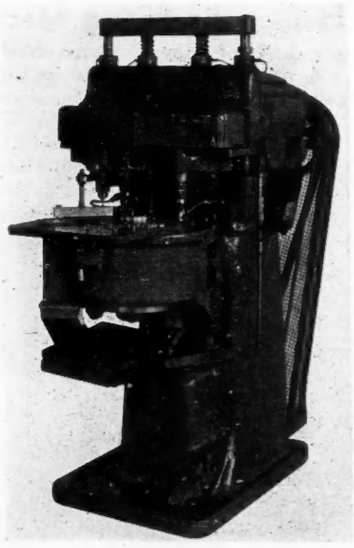
An unusually high degree of accuracy in the measuring screw is claimed, and the errors in the slide and table displacements are guaranteed not to exceed 0.00025 in.

The range of this machine is as follows: Horizontal travel, 24 in.; transverse travel, 16 in.; working surface of the table, 26 by 16 in., with a maximum of 24 in. between the upright housings.

Equipped with a two-speed motor, the machine has a range of spindle speeds from 50 to 1500.r.p.m. The spindle nose is equipped with a No. 2 Morse taper, and the accessories include an automatic center punch, a locating microscope, a drill guide attachment for small drilling, boring tools with a maximum boring capacity of 4 in., a centering device, a 13¾-in. circular table and a 12-in. universal tilting table. The weight is approximately 3550 lb.

Globe Dial-Type Drilling and Tapping Machine

As an addition to its line the Globe Tapping Machine Co., Bridgeport, Conn., has brought out a dial type double-headed combination drilling and tapping machine shown in the illustration. The machine was built for the second



operation on a screw-machine product, countersinking a 45-deg. angle and tapping a ¼-20 in. thread hole in a clinch-on nut at a rate of 60 finished pieces per minute. This machine has two spindle slides, and one slide is arranged with countersinking and the other with tapping spindles, a cam feed is used for the countersinking, the cam having a long lead and quick rise, and working independently of the slide carrying the tapping spindles. All spindles are adjustable and are driven through spur gearing.

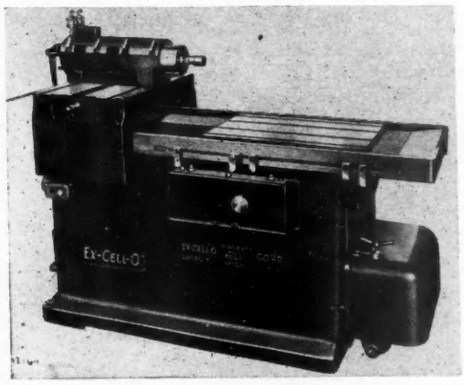
This machine is also equipped with an automatic trip-off which stops it automatically in case of jamming or abnormal resistance. The head is thus prevented from coming down and breaking taps or drills, and injury to the dial is eliminated. The pieces are fed into the dial by hand and automatically clamped and countersunk. They are then indexed to the tapping station where they are again clamped, and then tapped. Ejection is automatic.

The spindles and index mechanism are driven from a 1½ hp., 1750 r.p.m. motor mounted on a tilting plate inside the machine. From the motor, the drive is by belt to the clutch pulley at the rear top of the machine and then through a hardened and ground nickel steel worm, a bronze worm gear, rack and pinion and intermediate spur gears.

Ex-Cell-O Diamond Boring Machine

Since the announcement of the Ex-Cell-O precision diamond boring machine a year ago, the Ex-Cell-O Aircraft & Tool Corp., Detroit, has developed a smaller and more compact machine of the same type, for small production requirements.

This new Model 112 is single-ended and is equipped with one bridge for mounting from one to three motor-driven



boring units. The bridge is rigidly constructed and has T slots across the top for mounting the boring units. An adjusting screw is located near the top and center of the bridge for quickly adjusting the boring units. Each of the boring spindles has a self-contained, individually-balanced electric motor, of ¾ hp. at 3600 r.p.m., mounted concentric with it.

The fixture table is provided with flat and Vee ways, each way being lubricated by oil supplied automatically through air-drained valves. A 16 by 25-in. fixture pad is centrally located on the table and has several T slots for mounting the holding fixture. The table is provided with extra large water channels and with a large drain chute with a filter basket at the bridge end of the base, which can be easily removed for dumping the chips.

The hydraulic unit which operates the machine (and holding fixture if required) is driven by a standard 2 hp., 1200 r.p.m., ball-bearing motor. This motor is mounted on the inside of the machine as near the floor as possible, to miminize vibration, and drives both the coolant and oil pump. Large ventilators are provided in the bottom and the side wall for cooling the motor. The coolant pump, hydraulic pump and oil filter are mounted on a bracket at the end of the machine, and the whole unit is inclosed under one cover. The filter cleaning handle extends through the top of this cover, enabling the operator to clean the filter by one turn of the handle. All oil must pass through this filter before it enters the hydraulic system, thereby insuring clean oil throughout the entire machine giving smooth and dependable operation with a minimum amount

of wear. The oil reservoir is located in the base of the machine and is fully enclosed.

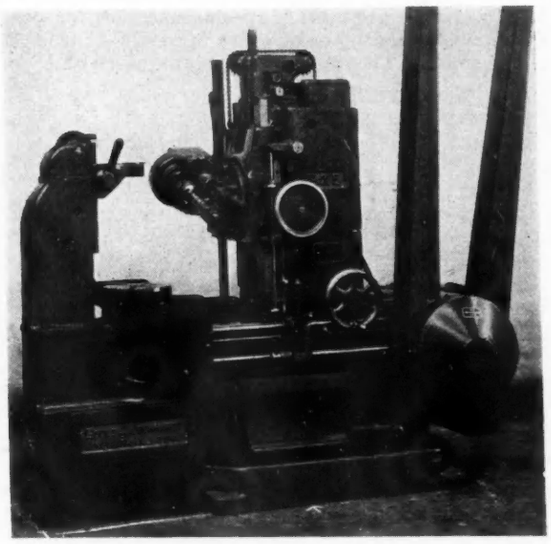
The low-pressure hydraulic system of this machine, developed by Ex-Cell-O engineers, permits of feeds of from 0.0005 in. up per revolution of the spindle. These feeds are obtained by the use of adjustable orifices, which give a range of uniform speeds to the table during the cutting operation.

Operation of the table is controlled by dogs mounted in a T slot on the front. These dogs control the fast and slow speeds in both directions, and the reverse, and ar adjustable for any cycle the machine may be called upon to perform. A hand control button is located on the front of the machine, convenient for the operator.

Universal Gear-Hobbing Machines

Gould & Eberhardt, Newark (Irvington), N. J., has added to its line two universal manufacturing-type gear hobbers, the 12-H and the 12-H Heavy.

These machines were specially developed for the production of helical and built-up herringbone gears as used in silent and synchro-mesh automobile transmissions. The



12-H manufacturing hobber, herewith illustrated, is adapted to cut gears up to 12-in. diameter with the support in place, and up to 18 in. with the support removed. It is rated for 5-pitch in steel and its weight is 4600 lb. The 12-H Heavy manufacturing hobber has the same diameter limits as the 12-H and is rated for 4-pitch in steel. Its weight is 6600 lb.

These new universal type machines embody the vertical cutting principle, with the cutter slide mounted on an adjustable stanchion and the work spindle fixedly located in the base of the machine.

The hob slide travels on double rectangular guides, provided with independent adjustments. The swivel cutter head has an angular adjustment of 180 deg. to permit cutting both right and left hand helical gears of any angle. To utilize the full length of hobs, a positioning device is provided to shift hobs axially to additional cutting positions, without removing the hob.

The power rapid traverse moves the cutter rapidly in either direction, and may be operated when the work and cutter spindles are idle or rotating. The traverse and feed controls are interlocked, so that one cannot be set in motion until the other is disconnected. An adjustable cam to stop rapid approach and safety pin prevent accidental downward operation of the power traverse.

The cycle of cutter movement comprises three phases, viz., rapid approach, feed, and rapid reverse, each automatically arrested at a predetermined point. Feeding motion automatically disengages the main clutch and stops the machine, but leaves the power traverse available.

Adjustable stops govern the movement of feed and traverse, and fixed safety stops control extreme limits of motion.

The cutter spindles on both machines are arranged with special adjustment features. The diameter and end fit of the spindle are independently adjusted and maintained without disturbing the setting of any other fit, or without dismantling or refitting the machine.

The machine is equipped with a single constant-speed driving pulley mounted on anti-friction bearings. Power is transmitted through a plate-type clutch arranged with a single convenient adjustment. A safety frictional slip gear is interposed in the power traverse drive. Tubular belt guards that are adjustable in position are furnished.

A constant speed motor of 5 hp., 1200 r.p.m. is recommended for the 12-H machine and a 7½-hp. motor is recommended for the 12-H Heavy machine. The drive is direct through either belt or silent chain.

Super-Johnson Clutch

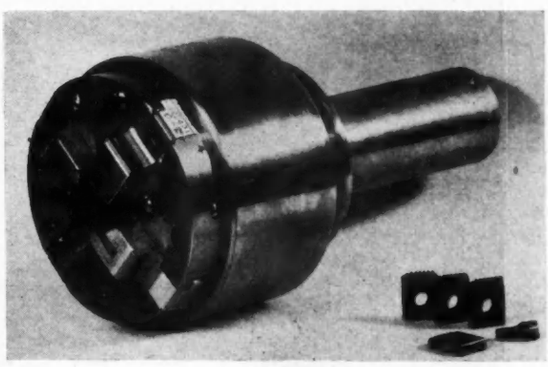
The following improvements have been made recently in the Johnson clutch, manufactured by the Carlyle Johnson Machine Co., Manchester, Conn.:

Instead of tool steel and carbon drop forged steel, chrome nickel steel is now used for the working parts. The expansion friction ring is now reinforced opposite the point of expansion. The adjustment has a locking device which holds the adjustment securely where it is set by the operator. In the new Super-Johnson type the friction ring is faced on the outside diameter with a special heat-resisting material. This "super clutch" is built especially for use on drives where high speeds, heavy starting loads, excessive slipping, and continuous engaging are required.

Eastern Self-Opening Die Head

A new type of self-opening die head, recently developed by the Eastern Machine Screw Corp., New Haven, Conn., eliminates the necessity of regrinding or resharpening the chasers or blades.

Instead of the usual large chasers of high speed steel, These inserts are held in place by a single screw that has carriers are substituted that take small high-speed inserts.



Machine Tools and Shop Equipment Announced for 1932

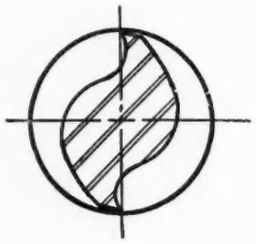
a draw-in feature which locks the insert back in the carrier so as to insure trackage and even distribution of the cut. These inserts, according to the manufacturer, are inexpensive and may be quickly replaced.

The carriers for any die head size are made to take inserts for a definite diameter range. For example, one range is for threads up to ½-in. in diameter, another for diameters above ½-in. up to ¾-in. and another for above ¾-in., up to 1-in., etc.

The same carriers are used for both the coarse and fine pitch series, since the correct helix angle is in the chasers. This makes it unnecessary to have a different set of carriers for each different thread.

National Helex Taper Pin Reamers

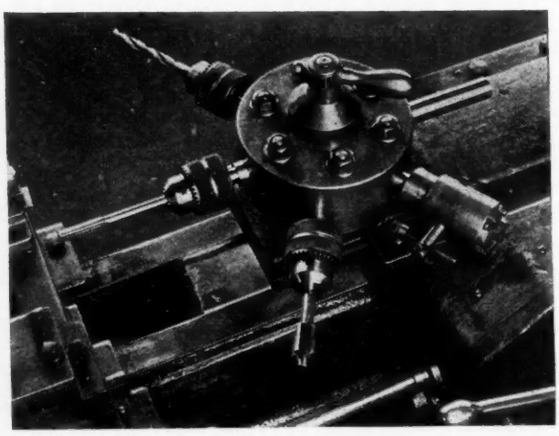
For machine reaming of taper pin holes the National Twist Drill & Tool Co., Detroit, Mich., has placed on the market the National Helex taper pin reamer herewith illustrated. It is claimed for this reamer that the steep helix angle promotes smooth cutting and eliminates chatter, that the rugged backing of the cutting edges prevents chipping, and that for these reasons the Helex can be run at higher speeds than ordinary reamers used for the purpose. The cutting edges are undercut and have a left-hand twist. The result is said to be a shear cut action and elimination of the tendency to "hog in." The chip spaces are said to be more than ample and the reamers can be run at speeds approaching drill speeds and yet produce true holes with a smooth, mirror-like finish, according to the manufacturer.



Chucks for Holding Turret Machine Tools

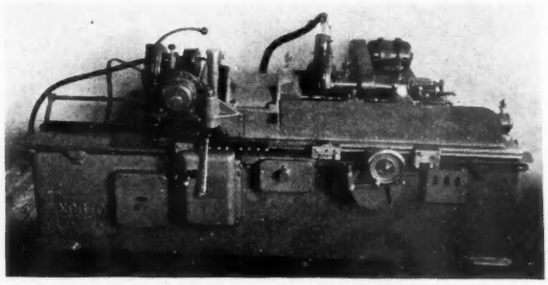
Until quite recently it was common practice to make up special tool holders for holding drills, reamers, counterbores, and other tools in the turrets of the lathe and screw machine. The Jacobs Mfg. Co., Hartford, Conn., informs us that this is now being discontinued in favor of chucks of the universal type, that is, chucks that can be adjusted to the holding of tools of varying diameters. It can readily be seen that this method effects considerable economy in tooling costs, inasmuch as a single chuck will take the place of a number of tool holders, the latter being limited to the holding of drills, reamers, etc., of a single diameter. Universal chucks are claimed to be easy to operate, and accurate, and to bring to the turret or screw machine the same ease of action as is demanded on the drill press.

The illustration shows the application of Jacobs chucks to the turret lathe.



Norton Automatic Cam Grinding Machine

Norton Company, Worcester, Mass., is now offering an automatic cam grinding machine for grinding cam contours essentially in the same manner as with the cam grinding attachments which were standard equipment in the past. Model cams carefully and accurately made by skilled workmen are used in special machines for generating the master cams, one of which is required for each cam on the shaft. The master cams are assembled on the master cam spindle and ground to the correct angular relationship. This machine is offered only where internal combustion engines are built in sufficient quantities to permit continual operation.



The various functions of cam grinding are performed automatically (most of them hydraulically) and it is possible for one operator to run three or four machines.

After a camshaft has been placed in the machine, the grinding operation is started by pressing an electric push button conveniently located near the operator's position. This actuates solenoids, one of which operates the valve controlling the table movement, and the other the work drive clutch. As the table moves so that the first cam to be ground is opposite the grinding wheel, another clutch is automatically engaged which starts the grinding cycle. Three cycle speeds are available.

As the wheel slide moves forward to grind the first cam, the master cam roller is brought in contact with the correct master cam, and a table stop lever is tripped, positioning it for the next indexing of the table. After the first cam is ground the wheel slide moves to its rearmost position, and the master cam and master cam roller are disengaged. Simultaneously the table moves to the second grinding position, the master cam roller to the corresponding master cam, and these functions are repeated.

After the last cam is ground the table moves to the truing position, and a predetermined, but adjustable, truing speed is automatically brought into action. One pass of the diamond is made across the face of the grinding wheel, and as the table carrying the diamond reverses, the work speed is automatically reduced for a finishing speed. A second pass of the diamond across the wheel is made, after which the table continues to move, positioning the work,

Machine Tools and Shop Equipment Announced for 1932

so that the last cam ground is in front of the grinding wheel ready for finish grinding. Each successive cam is then finish ground in a similar manner to the rough grinding operation until the wheel slide reaches its rear position after finishing the last cam and the table moves to the loading position, the work revolution automatically stops and the clutch is disengaged, stopping the entire cycle.

The machine is motor driven, three motors being required for its operation. A 3 or 5 h.p., 1800 r.p.m., constant-speed motor is mounted on the wheel slide and drives the grinding wheel. A 1 hp., 1200 r.p.m., constant-speed motor is mounted on the table and drives the work, while a third, a 5 hp., 1200 r.p.m., constant-speed motor, is mounted at the rear of the base of the machine and is directly connected to the lubricant pump and also drives the backshaft from which the hydraulic pump and the cycle mechanism obtain their power.

Hutto Internal Grinding Machine

A new grinding (honing) machine (Model MV500) has been added by the Hutto Engineering Co., Detroit, Mich. It is to be known as the Model MV500.

This machine is intended for the finish-grinding of heavy work, such as large truck, airplane and marine motor cylinders, Diesel engines, air compressor cylinders, etc. It has a wide range, accommodating any bores from 1½ in. to 8 in. in diameter, and up to 15½ in. in length, and with the use of special Hutto grinders, bores up to 18 in. long may be ground.

It is of vertical construction and compact in every detail. It requires a floor space of only 40 in. by 54 in., thereby affording its installation in any convenient location.

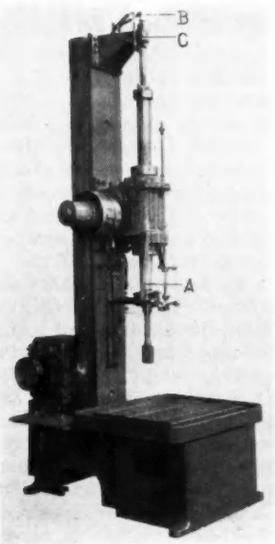
This machine is provided with four reciprocating speeds and two rotating speeds; thereby making it possible to obtain any desired finish in all bores. This feature is especially important where a high commercial finish is required.

A vertical motor supplies ample power, and a remote control automatic starter provides instant control of the motor. The head is easily raised or lowered by a conveniently located crank and can be locked into place at the desired height. The driving spindle is telescoped to permit extraction of the grinder from the bore without disturbing the set-up. Stroke adjustment mechanism is easily accessible after lifting off the front plate which is tightly held in place by four wing nuts.

Moline No. 13 Lapping Machine

Moline Tool Co., Moline, Ill., has added a new single-spindle lapping or honing machine to its "Hole Hog" line. This new No. 13 lapping machine has two outstanding features, viz.: The use of fabricated steel and the introduction of a new type of combined hydraulic cylinder and spindle.

The column is made of a pipe of 10¾ in. outside diameter, to which are welded two pieces of 1-in boiler plate, one 12 in. wide and the full length of the column to form the face, and the other 15 by 16 in. over the lower end,



for bolting to the base, which is box section and also serves as a coolant reservoir. A T-slotted table affords ample working surface.

Power can be taken from the line shaft or motor direct to the driving pulley on the horizontal shaft of the driving unit, which is bolted to the face of the column. Within the drive pulley there is a clutch operated by lever *A*, controlling the rotation of the spindle. Power is transmitted from the main shaft to a worm shaft through slip gears which can readily be changed for different speeds. A worm meshes with a large gear, mounted on a sleeve which acts as a driver and a bearing for the spindle.

The spindle is also the hydraulic cylinder and is the only reciprocating member of the entire machine. It is made of seamless tubing honed to a mirror finish. The piston rod is also a tube, held stationary by a bracket at the top of the column. Oil enters the piston rod at *B* for the down-stroke, and at *C* for the up-stroke.

Wear of the cylinder in the driving bushing is taken up by two adjustable bronze split bushings at each end of the spindle housing, the latter being packed with grease.

The stroke of the spindle is adjustable to a maximum of 24 in. An oil gear pump controls the rate of reciprocation, which is adjustable by means of a lever.

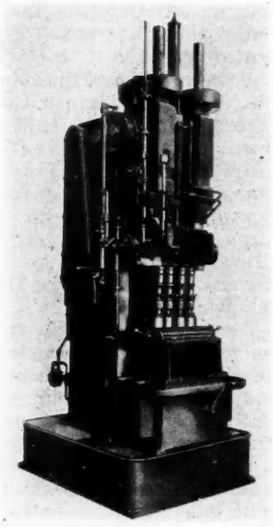
O.K. Tungsten Carbide Tools

A complete line of cemented tungsten carbide tools suitable for all requirements of automotive production is offered by the O. K. Tool Co., Shelton, Conn. It consists of tool bits for various metal-cutting operations; milling cutters with inserted blades, cutter blades, and a variety of boring heads, facing heads, and hollow mills. One of the features of this line is the patented tool holder designed specifically for cemented tungsten carbide tooling. Specifications and prices of the items comprising this line are found in bulletin No. 9J-28-1, recently issued.

Machine Tools and Shop Equipment Announced for 1932

Barnes Multiple-Cylinder Honing Machine

For economical production of motor cylinder blocks, the Barnes Drill Company, Rockford, Ill., has produced a self-oiling, all-geared, multiple-cylinder, hydraulically reciprocated honing machine, designated the No. 214. When cylinders are reamed to within 0.0015-0.003 in. of correct size, a production of about 100 blocks per hour is said to be obtained. The machine is designed to correct errors of out-of-roundness and taper, to remove all high spots, and to leave a bearing surface correct within 0.0005 in.



The column and base are of new design, the Oilgear pump being mounted in the column, and the filtering system and reservoir for the coolant in-built in the column and base. The laden coolant is pumped to the filtering tank in the column, from which clean coolant passes to the reservoir in the base, whence it is delivered to the work. Flow of the coolant is under automatic control, starting when the head is advanced to the honing position and ceasing when the head is lifted from the block.

An automatic counting device, electrically controlled, withdraws the hone from the block at the completion of a predetermined number of strokes. If more or fewer strokes than the number set for are required, the count is controlled by means of a push button.

The equipment with the machine shown in accompanying photo consists of a four-spindle adjustable type of auxiliary head and tunnel-type workholding fixture.

When desired, fixed or adjustable center type auxiliary heads are supplied for four, six, or eight-cylinder honing. Special workholding fixtures to meet the requirements may also be furnished.

WIDIA Cemented Tungsten Carbide

Thomas Prosser & Son, New York, N. Y., American representatives of Fried. Krupp, A. G., Essen, Germany, announce improvements in their WIDIA brand cemented tungsten carbide. It was found that one grade of tungsten carbide is not sufficient for the many possible applications of this material, and Krupp has developed various grades to meet this condition.

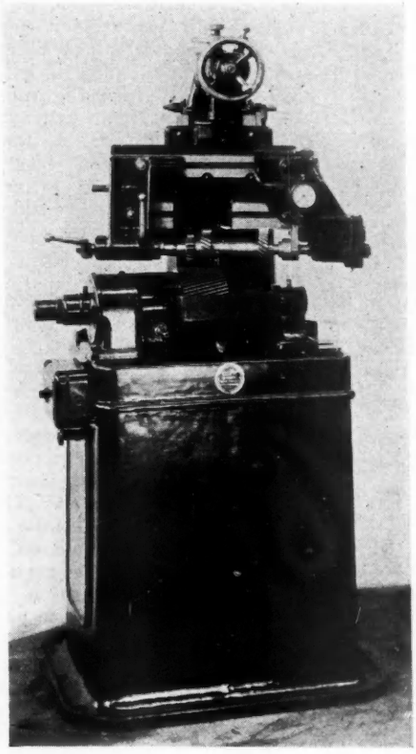
The L-31 grade is an extremely hard tungsten carbide and is specially adapted for taking light finishing cuts on hard material such as piston rings and other alloy cast iron parts. On Bakelite and also on other non-metallic materials it has been found superior to tools tipped with the normal grade, as the cutting edge remains sharp for a great many more pieces.

The "H-201" grade has been developed to machine hard, tough materials, and is used extensively in machining chilled iron rolls. This grade is also being used successfully in machining and threading hardened chrome nickel steel up to 95 scleroscope hardness. This material is said to be exceptionally valuable in places where difficulty is encountered with the normal grade of WIDIA chipping or flaking on the cutting edge.

"M-68" is recommended for high-speed precision boring. With this material it is said to be possible to get a very fine finish and hold the hole to very close tolerances, even on cast iron work.

Red Ring Gear-Tooth Lapping Machine

This machine, a product of the National Broach & Machine Co., Detroit, Mich., is used chiefly for lapping helical gears and has a capacity for gears up to 7 in. in diameter. It is claimed that by the patented methods used on this machine it is possible to obtain a tooth of very accurate shape, which is otherwise difficult to obtain except by more expensive practices. The production time is 3 to 5 min. per gear.



This machine is furnished with a built-in motor drive, reversing switches and automatic feed. The accompanying photograph shows a power tail stock installed, which serves to apply a brake load to the gears while lapping. On certain types of gears this permits of modifications in the tooth shape to conform to specifications.

Hardening High-Speed Steel

A method of hardening high-speed steel which is claimed to prevent the formation of scale on the steel, decarbonization and reduction in size, has been developed by the Sentry Co., Taunton, Mass., and is known as the Sentry diamond-block method of hardening high-speed steel. The

Sentry "diamond blocks"

"diamond blocks" are composed of a carbonaceous compound somewhat resembling graphite. When placed in a high temperature furnace this material gradually turns to a gas, producing an atmosphere which makes possible the heat treatment of high-speed steel to obtain the maximum hardness without scaling, decarbonizing, or otherwise affecting the surface.

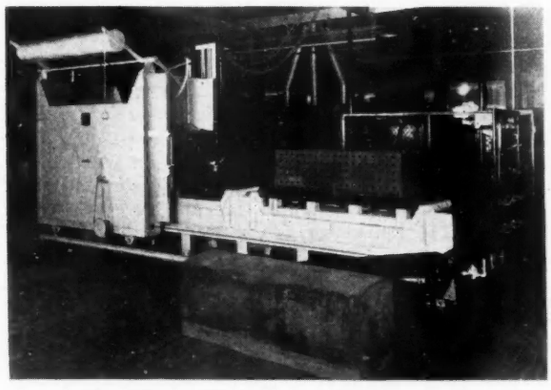
Sentry "diamond blocks" are furnished in several standard sizes with rectangular-section holes to accommodate the maximum size tools which can be hardened in each size block. They are also furnished either drilled or slotted for special requirements.

New Type Nitriding Furnace

The Electric Furnace Co., Salem, Ohio, recently completed the installation of a new nitriding furnace of the semi-reciprocating type. It is equipped with three nitriding boxes, one large and two small ones, each provided with forced gas circulation. The size of the largest box is 60 by 18 by 18 in., while the two smaller boxes are 19½ by 18 by 18 in. each.

The furnace is so designed that it is possible to run on different time cycles in the two smaller boxes simultaneously, and to accommodate a variety of sizes and shapes of material.

The furnace is claimed to be economical in the consumption of fuel and in the use of ammonia gas, this last feature being due to the fact that spent ammonia gas is used



both for purging the freshly loaded pots and during the cooling cycle. A satisfactory seal is said to be provided, which eliminates leaky bolted and gasketed joints and expensive soft-metal seals.

This same furnace may also be arranged for drawing, annealing and normalizing processes.

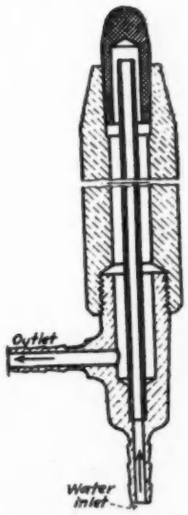
G. E. Mercury Tumble Switch

The General Electric Co., Schenectady, N. Y., has announced a new mercury flush tumble switch similar to the standard flush tumble switch except that the circuit is made and broken by mercury in a sealed tube. The tube of mercury is tilted by the handle when the switch is operated.

The switch has a composition box slightly deeper than the customary switch boxes. It is made only in the single-pole type.

"Elkaloy" Spot and Seam Welding Electrodes

For low-speed and foot-operated resistance welding machines, an electrode material known as "Elkaloy" has been developed by P. R. Mallory & Co., Indianapolis, Ind. Unlike "Elkonite," a tungsten-base material developed by the General Electric Research Laboratories and marketed by the Mallory company, Elkaloy is a copper-base alloy of moderate price.



On spot welding operations, particularly on hand operated machines, and also on seam welding, a die life of five times that of copper is claimed. In seam welding of coated material, such as terne plate or galvanized steel, Elkaloy does not pick up scale and coating as readily as copper, and hence the die need not be redressed as frequently.

Elkaloy is made in several grades. The hardness can be varied from 60 to more than 100 on the Rockwell B scale, or 300 Brinnell. With increased hardness, the conductivity drops from a maximum of 90 per cent of that of copper, but this range still makes direct substitution possible without changes in the electrical elements of the welding machines. At the temperatures of the average water-cooled electrode, the material does not anneal and hence does not readily mushroom out. It is sufficiently economical so that the entire replaceable electrode is Elkaloy, instead of being in the form of a small tip as is usual with the more costly Elkonite.

Curtis Air Hoist

What is claimed to be a decided improvement in the design and construction of the Curtis air hoist has been made by the manufacturer, the Curtis Pneumatic Machinery Co., St. Louis, Mo., by adopting a welded instead of a threaded-on head construction. At present only the sizes up to 8 in. diameter are made in the welded form, but the new type of construction is being gradually applied to the whole line.

This method consists in welding a plate into the upper end of the cylinder, and welding to that plate the suspension lug or eye, in case of a suspended hoist. Also, the ring is welded to the lower end of the cylinder to which the front head is bolted, thus giving all of the advantages of the screwed-on head construction, but doing away with the threading of both the cylinder and the casting, and even eliminating the castings themselves. This results in a construction that is lighter and simpler but equally strong.

The lower head itself is also welded, the stuffing box consisting of a piece of tubing welded to the plate, and the studs for the gland are welded to the stuffing box. The lug for the air port is also welded to the head plate.

The welded construction resulted in cutting the time of manufacture considerably, thereby not only reducing the costs, but also making it possible to expedite delivery on non-stock sizes.

Machine Tools and Shop Equipment Announced for 1932

Little Wizard Chain Hoist

David Round & Son, Cleveland, Ohio, recently announced a new low priced chain hoist known as the Little Wizard. Double roller bearings in the top sheave and single roller bearings in the bottom sheave carry the load on the up-pull. When lowering, one friction bearing and one roller bearing come into play, preventing the load from running down of its own accord.

An internal ratchet sustains the load at any point. It is placed in the center of the shaft, fully enclosed and completely lubricated. The bearings of both top and bottom sheaves are lubricated by the Alemite Zerk pressure system. The nipples are protected against damage. Owing to the reduction in the friction due to the use of anti-friction bearings, all sizes of the hoist can be operated by one man, for a capacity load. A new combination yoke-guide prevents the chain from kinking or twisting.

Wright Model 30 Screw Hoist

The new Wright Model 30 hoist, herewith illustrated, is lighter, more compact and more efficient. It is recommended for general work where it must be continually carried about and operated in different places. It is also adaptable for work in a horizontal direction, such as moving heavy loads on rollers or skids.

Model 30 hoist is designed on the worm-wheel principle, consists of few parts, and is of simple construction. It holds the load securely at any point.

Load chain guards shroud the upper half of the load wheel and prevent the load chain from riding out of the load-wheel pockets. A non-fouling hand chain guide is provided. This hoist is manufactured by Wright Mfg. Co., Bridgeport, Conn.

Elwell-Parker 6000 Lb. Lift Truck

Following the first application of a pair of forks to the front of an electric lift truck platform, a demand arose for trucks of this type of increased capacity, and the Elwell-Parker Electric Co. of Cleveland, Ohio, has developed such a truck for loads up to 6000 lb. Either a battery or a gas-electric generating unit may be carried for power purposes. All operating safety features of the straight electric truck are retained in the gas-electric system, and the electric controller obviates the need for a clutch and transmission.

The truck is driven by an electric motor through worm gearing. The driving wheels are said to be the largest used on electric industrial trucks, being 22-in. in diameter. The powerplant is supported at three points.

The trailing axle, which carries 15 by 7-in. wheels, likewise is provided with knuckles, and the truck therefore steers by all four wheels. This axle is pivoted at the center, so that the load forks in front of it are level even though the wheels may not be on a level floor.

The forks are made in various lengths and with varying spreads, to suit the material to be handled. After the forks are thrust under the load the latter may be tilted back 30 deg. so that it can be carried safely to its destination, where it may be elevated 5 ft. for tiering.

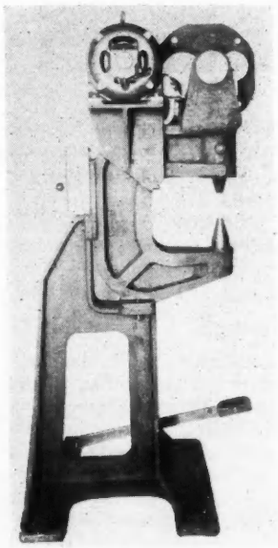
When higher tiering is necessary, the uprights are made longer so that the fork carriage which travels in it may

rise to greater heights. Where headroom is restricted as in cars or through doorways and it is desired to tier loads to great heights later, telescoping uprights will be furnished.

The tilt and hoist features are accomplished by one unit. The lift is by cable while the positive tilt is by rack and pinion drive. Automatic limit switches used throughout.

Norin Mechanical Riveter

Norin Engineering Co. of Chicago is placing on the market a mechanical riveter driven by an electric motor mounted in the head frame with the plunger mechanism. Economy of power is claimed for the riveter, which is driven by a 1½ hp. motor for a pressure of 25 tons.



Energy for setting the rivets is derived from a flywheel. The power is transmitted through planetary gears to a release clutch and an operating clutch. The former releases when the maximum load is exerted to protect the machine parts against overload. Added flexibility is claimed to result from the use of the release clutch. The operating clutch never is shifted under load. Rivets are driven with one stroke, the plunger moving automatically on the return.

On the shaft from the driving mechanism is an arm with a hardened and ground steel roller, which works on a cam fastened to the plunger. The cam is designed to give a fast motion to the plunger at the beginning of the stroke, and

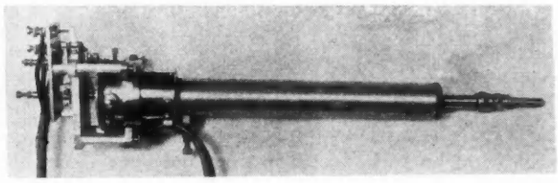
Machine Tools and Shop Equipment Announced for 1932

as the speed decreases the pressure increases. The last portion of the riveting stroke develops a uniform pressure which provides for the driving of rivets in various riveting grips.

Keller Combination Tracer

Two new attachments have been brought out by the Keller Mechanical Engineering Corp., Brooklyn, N. Y., for use in connection with its automatic tool room machines. One of these permits of machining a right-hand piece from a left-hand model. This makes it possible to produce from a wooden pattern of a right-side body panel, both the right and left-side panel punches. This is known as the "right-and-left" attachment and is designed to fit the standard models.

For regular duplication work, model and work piece are stationary on the machine fixture; to produce a reverse



of the model, the "right-and-left" fixture introduces a relative horizontal movement between model and workpiece. The workpiece still remains stationary, but the movement of the model in connection with the movement of the cutter has the same effect as if the model traveled in the opposite direction to the workpiece, so producing a "left" from a "right," or vice versa.

The other development is a device known as a "combination tracer" which combines the features of the two electrical tracers used on Keller machines. This new tracer makes it possible to follow all three dimensions of a model at the same time. It is, for instance, possible to cut a bead in a drawing die punch, the tracer point traveling along the edge of the bead and at the same time following any variation in depth of the model. Besides saving time, this new method gives a smooth finish and eliminates practically all hand finishing work.

Hercules Portable Belt Sander

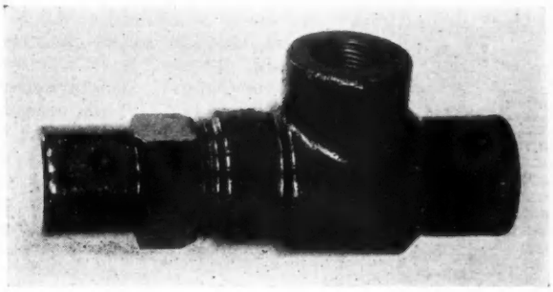
The Hercules portable belt sander, manufactured by the Buckeye Portable Tool Co., Dayton, Ohio, is used for smoothing down welds, sanding automobile bodies, smoothing up large steel dies, etc. It will work on either flat, convex or concave surfaces, a special attachment for concave surfaces being a feature.

The sander is suspended over the job by a suspension pulley and cable, and is easily handled by one man. It is powered by two No. 300 type Hercules rotary air motors developing 1 1/13 hp. each, at 85 lb. per sq. in. air pressure. The motors are directly back of each pulley and are direct connected. Two small air cylinders mounted on the main frame serve to tighten the belts, and when the throttle is opened the air pressure passes first into these cylinders and then into the motors proper. When the throttle is shut off all tension on the belt is relieved, but it is still held firm enough to stay on the pulleys.

The wheel guards are flexible, and are held in place on the frame by a spring, so that, should the operator's hand slip under the guard, the spring permits it to be withdrawn quickly by allowing the guard to be raised.

B & S Pressure Relief Valve

A pressure relief valve designed especially for use in conjunction with hydraulically operated machinery has been recently added to the line of pumps and accessories made by the Brown & Sharpe Mfg. Co. of Providence, R. I. This valve is particularly adapted to operate in connection with hydraulic mechanisms and with the Nos. 53 and 55 rotary geared pumps made by this manufacturer.

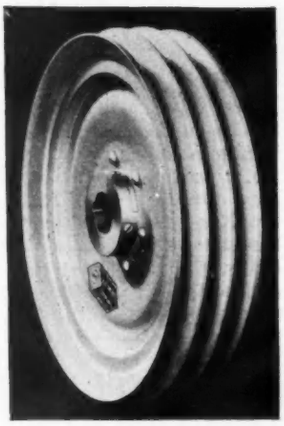


By removing the hexagon cap and turning the adjustable screw, the compression on the valve springs may readily be adjusted so that the valve may be set to operate at pressures from 0 to 200 lb. p. sq.in. Guides on the valve prevent fluttering and noisy operation.

The valve is made to take 1-in. piping.

New Light Texsteel Sheaves

A new type of pressed steel Texrope sheave to meet the demand for a lightweight, low-priced drive has been developed by Allis-Chalmers Mfg. Co., Milwaukee, Wis.



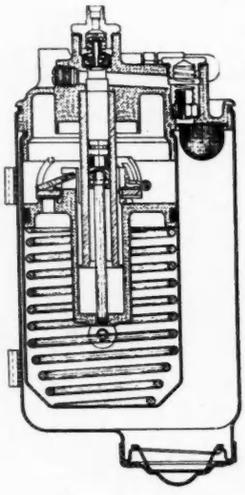
Texsteel sheaves are made of coned annular disks, diepressed of very tough steel, which are welded together on both their inner and outer edges. They are manufactured in a large number of diameters, permitting ratios as high as 6:1. They are painted with aluminum paint as a rust protection and for the sake of appearance.

Machine Tools and Shop Equipment Announced for 1932

Texsteel sheaves are said to be specially adapted for use on machine tools. When used in connection with Texrope belts, they are said to be highly efficient. Being accurately balanced, they do not introduce vibration, and the manufacturer holds that they even have a tendency to absorb vibration originating elsewhere.

Automatic Lubrication System for Machine Tools

Lubrication Devices, Inc., Battle Creek, Mich., announces the new Type C automatic lubrication system, which consists essentially of three parts, viz., the compressor unit, a single main pipe line, and a measuring valve at each bearing. The system is fully automatic in operation, starting when the machine starts, and stopping when the machine stops. Oil can be furnished to the bearings at any frequency desired, from every 30 seconds to every 30 minutes. All bearings are lubricated simultaneously.



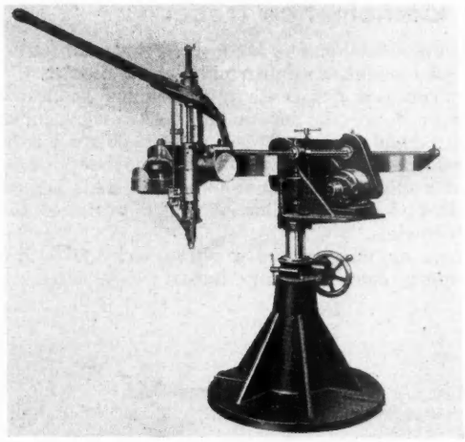
The Type C system delivers the lubricant at high pressure, and it is claimed that both the tight and loose bearings are properly lubricated at all times. It is stated that the system will successfully deliver any grade of oil, provided the temperature of use does not fall below the pour point of the lubricant.

The operation of the automatic compressor unit is entirely hydraulic, and a pressure of 20 lb. p. sq. in. or more is the only motive power necessary. The unit is self-contained within a one-quart reservoir. It is of simple construction with all parts sealed and operating in a bath of oil. Where hydraulic pressure is not available, any type of small rotary pump can be used.

Reynolds Screw-Driving Machines

Two additional models have been marketed recently by the Reynolds Machine Co., Massillon, Ohio, who specialize in automatic screw-driving machinery. One of these is the No. 2 pedestal radial type and the other the No. 2 heavy-duty type. Both types have automatic magazine feed. The No. 2 pedestal type, which is herewith illustrated, will magazine and drive without change or adjustment, three consecutive sizes of wood or machine screws, from No. 6 to No. 14 inclusive; if smaller than No. 10, up to 1½-in. in length; from No. 10 to No. 14 1¾-in. in length. It will drive screws in a circle of 2 ft. 7½-in. minimum and 10 ft. maximum diameter. The distance from the floor to the chuck is adjustable from a minimum of 27 to a maximum of 43-in. A ¾ hp. motor is required and the spindle speed is 850 to 900 r.p.m.

The No. 2 size heavy duty machine will magazine and drive without change or adjustment any three consecutive sizes of wood or machine screws, from No. 6 to No. 14 inclusive, and the limitations as to length are the same as



for the No. 2 pedestal radial type. It will drive screws to the center of an 18-in. circle in work not over 18 in. high. The machine, which requires a motor of 1-2 hp., may be equipped with a motor plate for individual motor drive. Its spindle speed is also 850 to 900 r.p.m.

Barnstead Water-Distilling Equipment

A line of "hard-water" models of Barnstead automatic water stills, recently introduced by the Barnstead Still and Sterilizer Co. of Boston, Mass., are distinguished by an extra high baffled evaporator and a "constant bleeder" device by means of which the dissolved and suspended impurities in the water of the evaporator are kept at virtually a constant concentration—practically that of the incoming feedwater. This is said to eliminate risk of entrainment, thus safeguarding the distillate from possible contamination. Moreover, the rate of formation of scale and need for cleaning are said to be greatly reduced.

The Barnstead full-automatic-controlled distilled water system consists essentially of a water still, a distilled-water storage tank, and self-starting, stopping, flushing controls. Operation of the still is started and stopped automatically, and an adequate reserve supply of distilled water is automatically maintained in the storage tank at all times.

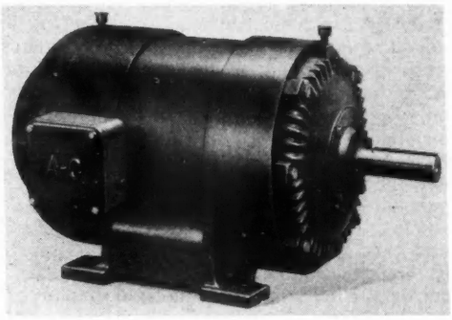
In the automotive industry these stills are employed for the production of distilled water utilized in laboratory research and plant control; for process requirements (mirror-silvering, for instance), and for storage battery service.

Explosion-Proof Motor

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has developed a new line of explosion-proof motors that is approved for use in hazardous atmospheres, such as are encountered in oil refineries, gasoline plants, dry cleaning plants, paint, varnish and lacquer plants, etc. These motors have been tested and approved by the Underwriters' Laboratories, and carry the Laboratory label for use in Class 1, Group D locations (gasoline and pyroxylin-lacquer vapor).

Machine Tools and Shop Equipment Announced for 1932

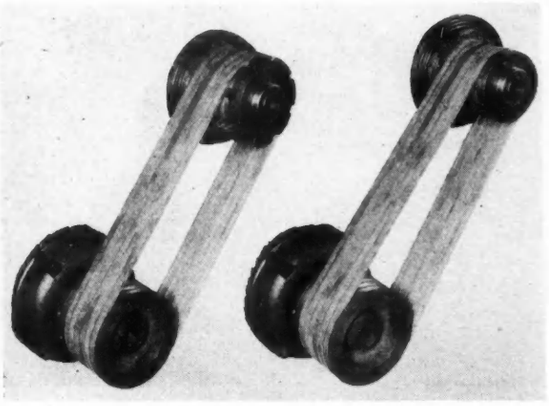
These explosion-proof motors are designed on the same general lines as Allis-Chalmers totally inclosed, fan-cooled motors, their special features including extra long bronze bearing seals to prevent flame from getting out and to cool the gases below the point of ignition; special alloy steel cap



screws that fit into tapped pockets, and unusual sturdiness to safely resist stresses due to possible minor internal explosions or flashes. In addition to the sealed motor leads, a special explosion-proof cast iron conduit box gives protection against possible contact with surrounding air.

Hammond Variable-Speed Drive

A variable speed drive for use in connection with shop equipment is being manufactured by Hammond Machinery Builders, Kalamazoo, Mich. Illustration (at left) herewith shows the variable speed pulley in the expanded



position and at a motor speed of 1750 r.p.m. and a suitable motor pulley, the spindle is operated at 2000 r.p.m. Illustration (at right) shows the same motor and pulley but with the variable-speed pulley closed up. In this case the spindle is operated at a speed of 2800 r.p.m.

"Plaskon," a Synthetic Resin

According to a research report published by Mellon Institute of Industrial Research, Pittsburgh, Pa., a novel heat-reactive molding compound is now being produced commercially in the plant of Toledo Synthetic Products, Inc., Toledo, Ohio. This new urea-base compound, called "Plaskon," was evolved at Mellon Institute under a series of industrial fellowships sustained by the Toledo Scale Co. Copies of the report may be obtained on request to the Institute.

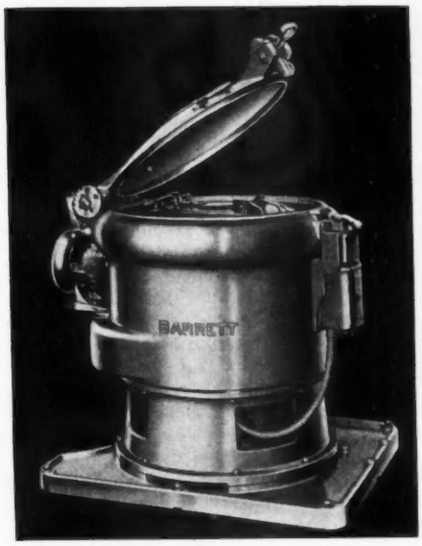
"Plaskon" molding compound is said to be easily preformed, and it is pointed out that this property, in conjunction with the high speed of cure, makes possible rapid low-cost mass fabrication by the molder. Fabricated "Plaskon" is described as unexcelled in color possibilities, combining bright colors with a hard, lustrous surface.

The mechanical and electrical properties of "Plaskon" are said to be excellent; they are summarized in the following table, which has been taken from the report.

Specific gravity	1.43.
Modulus of rupture	10,000 to 14,000 lb. sq. in.
Tensile strength	4,000 to 6,000 lb. sq. in.
Compressive strength	25,000 to 30,000 lb. sq. in.
Impact strength (Sharpe)	0.7 to 1.2 ft. lb.
Dielectric constant (25°C.)	5 to 6.
Dielectric strength (puncture)	300 to 400 volts per mil.
Water absorption (20°C.; ⅛-in. section)	0.07 to 0.66 per cent. in 24 hrs.
Resistance to solvents	Unaffected by alcohol, acetone, oil, or other common solvents.
Resistances to acids	Moderately resistant to cold dilute acids. Not resistant to hot or concentrated acids.
Resistance to alkalies	Quite resistant to cold dilute alkalies. Also resists hot, very dilute alkalies, such as soap, borax, cleaners, etc.
Hardness (Mohr scale)	3.0 to 3.5.
Hardness (scleroscope)	80 to 95.
Workability	"Plaskon" can be machined, bored, resurfaced, and polished.

Barrett Machine-Shop Equipment

Leon J. Barrett Co., Worcester, Mass., manufactures a number of machines suitable for application in machine shops. One of these is the Barrett centrifugal oil extractor, which is designed primarily for reclaiming cutting oil carried by the chips and machined parts. The apparatus is claimed to extract all the removable oil and to complete the entire cycle of loading, extracting and unloading in three minutes. One operator with proper handling facilities can run three machines. They are made both with belt drives and with electric motor built



Machine Tools and Shop Equipment Announced for 1932

in. A number of sizes are available, in capacities up to 60 cu. ft. of product per hour.

The Barrett Typhoon Washer and Cyclone Dryer is used for the washing and drying of metal parts such as screw machine products, stampings, bearings, etc. The only limitation on the material is that it must be possible to arrange it in fairly even balance. The centrifugal force drives the washing solution under pressure over the surfaces and also throws off the dirt. The rapid rotation creates a fan action which draws through hot air to facilitate drying.

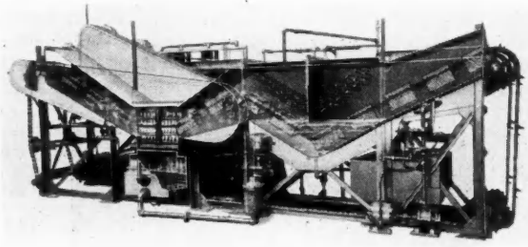
The Barrett Filwhirl Enameler serves to coat small articles in bulk, giving them an even coating of oil, enamel, etc., and returning all excess material for reuse. The cycle requires about three minutes and parts go directly to the oven, no racking or stringing being necessary.

The Barrett Centrifugal Impregnator is used for impregnating such parts as coils, wood and fiber with varnish, wax, oil or dye, and is claimed to assure thorough penetration and coverage of interior surfaces in a very short time.

In all of the machines described the load is pivoted on the base, which practically eliminates vibration; pans are easily and quickly removed to facilitate economical operation, and safety interlocks prevent accidental starting. The largest model occupies only about 15 sq. ft. of floor space.

The S. M. Metal Cleaning System

Equipment for cleaning greasy metal parts by the S.M. process, making use of the cleaning material Perm-A-Clor, is being supplied by the Rex Products & Mfg. Co., Detroit, Mich. Perm-A-Clor is a specially prepared compound in liquid or vapor form for which it is claimed that it is



permanent in quality, acid-free and non-inflammable, and that it dissolves oils many times more rapidly than gasoline, benzene, colene spirits or alcohols.

Referring to the illustration of the machine herewith, the work is placed on the conveyor and enters the machine in a compartment where it is drenched with the heavy fog of the solvent, which loosens the foreign material and prepares the work for powerful streams of boiling solvent which impinge upon it from all directions. This loosens all the dirt and oil, and the work then passes along the conveyor and is rinsed in a bath of clear hot solvent, after which it leaves the machine, clean, dry and warm.

The method of cleaning here described is said to eliminate all hand-wiping, blow-offs, dryers, etc., leaving no residue on the surface of the metal to slow up or interfere with subsequent operations, such as plating, vitreous enameling or rust-proofing. The saving due to the elimination of hand-wiping, blow-offs and drying is said to be quite important. It is claimed, moreover, than the characteristics of Perm-A-Clor and the provision of condensers in the solvent machine prevent excessive loss of material by evaporation.

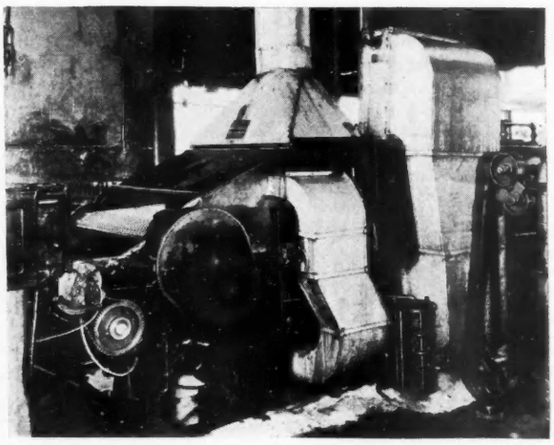
The process is being recommended by the manufacturers particularly for removing heavy lubricating oils from machined, stamped or quenched parts; preparing metals for plating, vitreous enameling, painting, lacquering or other surface coating, as well as for preparing zinc, aluminum, die-casting and other soft metals for subsequent operations.

The solvent machine may be made to fit into regular production schemes and placed at the point where the cleaning operation is needed.

After being boiled, the solvent Perm-A-Clor is condensed and then furnishes the clear liquid for the rinse. Moreover, being permanent in character, it can be used over and over. It is stated that the total amount of solvent in the machine may be distilled in one hour, and the accumulated oil, dirt and other foreign matter removed, leaving the clear distilled solvent which may be used anew.

D. S. M. Rust-Proofing Machine

The photograph reproduced herewith illustrates an assembly of the new rust-proofing machine developed by the Detroit Sheet Metal Works, Detroit, Mich., in connection with a washing and drying machine. In the foreground is seen the transfer from the dry-off chamber to the



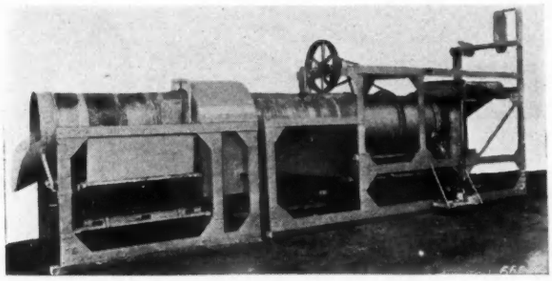
slide which loads parts onto the rust-proofing machine. This machine embodies a conveyor and apparatus for applying the rust-proofing compound.

This rust-proofing machine finds application in plants where finished parts are put in service stockrooms before shipment, or on parts for export shipment. A very tough, rust-proof coating can be applied which resists salt water shipment very successfully.

Ideal Rotary Pickling Machine

This equipment, manufactured by N. Ransohoff, Inc., Cincinnati, Ohio, consists of several connected sections. The first of these is the pickling drum, which is lined with Goodrich Rubber Co. Triflex rubber 9/16 in. thick, vulcanized to the shell. The work is brought to this drum in standard tote boxes and charged into it by a crane, or the machine may be equipped with a power loader designed to accommodate standard tote boxes. This drum rotates at 6 r.p.m. gently agitating the work in a flowing bath of sulphuric acid. This agitation is gentle enough to permit the handling of soft threaded work in the machine without danger of marring. The acid is pumped into the drum from a lead-lined tank located beneath it and drains

back into the tank. This tank projects on one side of the machine and is so shaped that the accumulated sludge and scale can be readily removed from it. The work is retained in this rotating drum until the pickling is completed. Reversing the direction of rotation discharges the



work through a spiral head into a continuous screen made of acid-resisting metal. In the first part of this screen, the work is drained, and in the second it passes under a spray from city water lines. After this rinse, it is drenched with a fluxing solution of zinc chloride or muriatic acid. It is then discharged from the end of the screen onto the hot plate for drying. The machine can be furnished with a final drying screen so that the work will be delivered pickled, fluxed and dried, ready for galvanizing.

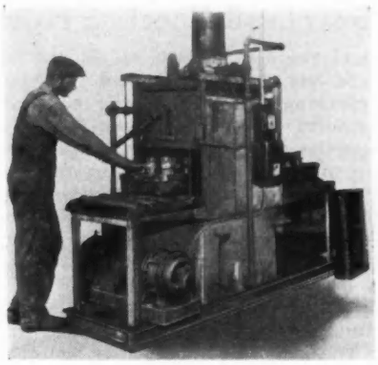
Lufkin "Crescent" Tape Rule

A 6-foot measure combining the convenience of a pocket tape and the utility of a rule, has been brought out by The Lufkin Rule Co., Saginaw, Mich. It is known as the "Crescent" tape-rule and consists of an accurate steel tape that automatically winds into a case 2 in. in diameter, yet when withdrawn it is rigid like a rule.

The line or rule blade is of tempered steel, stiffened by special forming. It is nickel-plated and has prominent dark markings. Unsupported, it may be projected like a rule. It will also flex around and accurately measure circular, round-cornered and other shaped objects. Measurement is taken when the outer end is projected against any object, and the solid clip at the first end serves for withdrawing the rule blade from the case and also as a hook for taking measurements out of arm's reach. The case is chromium-plated, and has a smooth-working, spring-winding device, with a ratchet stop.

Metal Parts Washing Machine

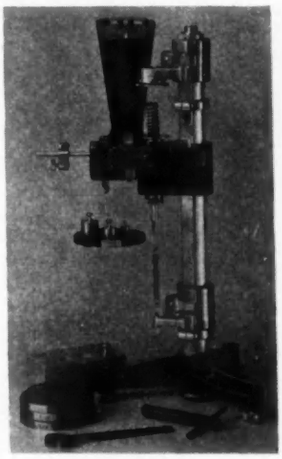
The machine illustrated herewith is the Model H metal-parts washing machine of the Detroit Sheet Metal Works, Detroit, Mich. In this machine the parts are cleaned in



open-mesh boxes. The machine is semi-automatic in operation. The load is rolled in by hand, and when the door lever is pushed up, both doors are closed and the high-pressure washing jets are put into operation. Grease, after being washed off, is continuously skimmed from the sludge trough by an overflow.

Coats Elasticometer Spring Testing Machine

The latest addition to the line of loose weight and pendulum spring testing machines of Coats Machine Tool Co., Inc., New York, is the Type RS 2, which has a capacity limit of 5 lb. It serves to test either compression or extension springs, among the automobile springs that can be tested on this machine being those used in starter machanisms. The testing machine works on knife edges, in the same manner as the larger machines and was designed to satisfy the demand for a machine particularly suitable for the quick inspection of light springs. Since the machine has a maximum load capacity of only 5 lb., the scale consists of a single lever in the ratio of 1 : 1. From the outer end of this beam or lever, the weight-carrier is suspended, whereas the inner end supports a bar, guided in steel balls, which carries a compression plate or platform above and a tension hook below. A pointer, directly fastened to the beam, completes the weigher scale, which latter is inclosed in a housing, slidably arranged on the pillar of the machine, to which it is clamped. Tension and compression tests are made by means of slides. Adjustable stops limit the motion of these slides for quantity inspection. A water level is provided on top of the column, indicating horizontal alignment of the tripod base.



Machine Tools and Shop Equipment Announced for 1932

Helical Gear Lead Checking Fixture

Since helical gears came into use in automotive transmissions there has arisen a demand for some means of accurately checking the lead or the helix angle of the gears. Engineers of the Michigan Tool Co., Detroit, Mich., came to the conclusion that it is far better to check the lead than to try to check the helix angle, for the reason that the lead is constant whether measured at the root diameter, pitch diameter or outside diameter, whereas the helix angle changes with the diameter on which it is being measured.

With this in mind, the Michigan Tool Co. designed a lead-checking fixture for checking helical gears up to 16 in. diameter and up to 10 in. lead, with either right or left-hand helix. The gear to be checked is mounted on a stub arbor or between centers. The design of the fixture is based on the sine-bar principle, the same as a fixture

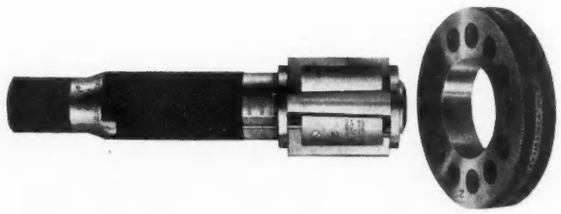
made by the same company for checking the leads of hobs and worms.

After placing the gear to be checked on the stub arbor or between centers, the sine bar is set at the proper angle to check the lead in question. This setting is accomplished very accurately by means of two measuring buttons. The sine bar may be set on either side of the center line, depending on whether the helix is right or left hand.

Increased Capacity on Bath Internal Micrometers

John Bath & Co., Inc., Worcester, Mass., has completed a redesign of its line of Bath internal micrometers which widens their scope of application and is said to result in a lower cost per unit of capacity measured. This tool, together with the Bath master reference ring, is used for hole measurement. With this tool each reading is a master measurement and the dial graduations enable the user to read directly in 0.0001 in.

Standard micrometers are made in sizes from ¾ in. to



3 11/16 in., while special larger sizes can be made to order. Where a user desires to measure a complete range of sizes, say, from 1¼ to 1 11/16 in., this can now be accomplished by means of a smaller number of micrometers. There are no gaps between the ranges of consecutive sizes, as these ranges overlap.

Olsen Motor-Driven Brinnell Machine

A Brinell hardness testing machine operated by an electric motor and designed for production testing has been developed by the Tinius Olsen Testing Machine Co. of Philadelphia. The machine is said to be rapid in operation and unusually silent and to apply the load very smoothly. It can be operated also by means of a treadle. To this end a rod extending down from the front of the segment on the lever at the right side is connected up to the treadle. All moving parts of the machine are completely inclosed and run in a bath of oil.

Olsen Ductility Testing Machine

Tinius Olsen Testing Machine Co. of Philadelphia manufactures a motor-driven machine for ascertaining the ductility of sheet metals. Power is applied and the load weighed hydraulically. The cupping-tool-operating mechanism is similar to the mechanism drive of other Olsen ductility testing machines. Depth of cup and applied load are indicated throughout the test. As the material is inserted and clamped in place, the thickness of the material is shown by the graduated scale under the handwheel.

Increase in load is automatically stopped for any desired depth of cup. The load is then released and increases gradually and smoothly up to the point of fracture, for which both the depth of cup and amount of load are shown.

The depth of cup for the initial load may be set as desired. For instance, in the case of a specimen 1/16 in. thick, the machine can be set for a ¼-in. depth of cup by a device under the handwheel in front of the machine. When a ¼-in. depth of cup has been produced by the cupping tool, increase in load is automatically stopped, and the load is read off on the large dial on the front of the machine. By then moving the small handle on the front

Machine Tools and Shop Equipment Announced for 1932

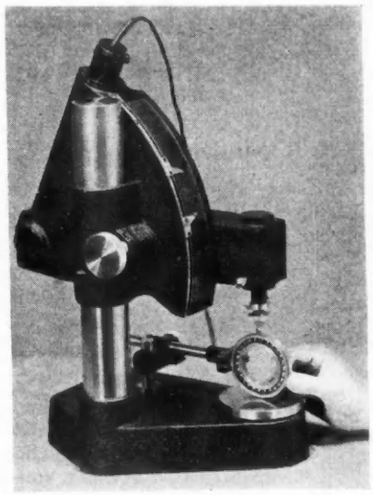
of the machine, the load is again released, and increases to the point of fracture of the specimen. When the pointer on the large dial on the front stops its forward motion and starts backward, fracture has occurred, and the load indicated by the dial pointer, which is the maximum load applied, is then noted. The dial at the top of the machine

indicates the depth of cup corresponding to the instantaneous load, and, after fracture, the pointer on this dial remains in the position of maximum applied load until the specimen is removed.

The motor and pump are started and stopped by the lever on top of the pump casing. Pressure is applied and controlled by the lever at the front of the pump housing.

Zeiss Amplifying Gage

George Scherr Co., New York, N. Y., is offering a new measuring or checking tool, the outstanding feature of which is that the amplification is mainly optical, by tilting a mirror, which throws a spot of light and the index mark against the scale. The instrument is provided with two adjustable limit hands, which are set to go and no-go limits, and is also equipped with an accurate scale of long range,



namely, plus and minus 0.005 in., reading directly in 0.00005 in. This makes the instrument suitable not only for checking in mass production on go and no-go, but (by using the scale) for assorting parts for different fits as is necessary for selective assembly.

This checking tool, known as the Zeiss optotest, is sold at a price which is said to be about the same as that of an amplifier using a dial gage, but the scale is said to be more accurate, the largest error over the whole range not exceeding 0.00005 in., it is claimed.

Micromax Potentiometer Pyrometer

Leeds & Northrup Co., Philadelphia, Pa., has announced a new type of its potentiometer pyrometer, known as the Micromax. The improved instrument requires no manual adjustments. The instrument circuit is standardized automatically every 45 minutes or less, and the adjustment is said to be closer than can be obtained manually.

By virtue of its microscopically sensitive balancing device, Micromax can detect and record deflections of the galvanometer pointer amounting to 1/1000th of an inch. Micrometer sensitivity makes the recorder action responsive and speedy, sending the pen, or print wheel, across the chart paper in steps that are much more accurately proportionate to the temperature change. If necessary, the recording pen, or print wheel, can step across the entire chart in less than 22 seconds, the size of each step being closely related to the extent of galvanometer pointer deflection.

The rapid recording feature is said to be of particular value in connection with automatic control and where more than one temperature is being measured.

Warner Reverse-Bend Machine

Warner reverse-bend testing machines are supplied by the Tinius Olsen Testing Machine Co., Philadelphia, in various sizes and types, and either hand-operated or motor-driven. The machine illustrated herewith is intended for small rods and flat specimens. In the operation of the machine the specimen is bent back and forth over definitely shaped jaws so that smooth bending in opposite directions is alternately effected. The jaws in the machine illustrated have a relatively small radius close to where the specimen is gripped. The two large rollers at the top of the machine are caused to oscillate back and forth and travel in a path parallel to the tops of the grip blocks in which the specimen is held.

The hand machine shown is operated either with the bar at the top or with the handwheel on the large gear at the right side for slower speed, and to provide more power for larger specimens the hand crank is placed on the pinion spindle, as shown in the illustration.

The counter mounted over the driving gear counts the number of strokes required to break the specimen.

Usually only a few strokes are necessary to break the specimen, and the hand-operated machine serves the purpose satisfactorily, but motor drive can be supplied for greater convenience or where heavier specimens are to be tested and more power is needed.

What Has Gone Before—

Improvements in Grinding Operations Have Helped Speed Production

Semi-Automatic Infeed Unit

A semi-automatic infeed unit consisting of an improved means for rough and finish-grinding cylindrical shafts having multiple diameters has been developed by Cincinnati Grinders, Inc., Cincinnati, Ohio. The operation of machines equipped with this unit is very simple. Once the shaft is placed between centers, it remains in position until completely ground. The wheel head travels rapidly toward the work until a positive block stop contacts with the proper step on the cam. Limits of plus or minus 0.0002 in. are held on all diameters. (Sept. 5, page 380.)

Desmond Wheel Dresser

A heavy - duty dresser for gronding wheels is a late addition to the line of the Desmond-Stephan Mfg. Co., Urbana, Ohio. It is especially designed for dressing large and coarse grinding wheels, particularly those high-speed wheels bonded with Bakelite and hard rubber. This dresser will operate equally well on either silicate or vitrified wheels. (Sept. 12, page 414.)

Hisey Improves Grinders

The commutating type repulsion induction motor is now standard equipment on Hisey 6 and 7 in. grinders, made by the Hisey-Wolf Machine Co., Cincinnati, Ohio. Starting current is only about one-third that usually required, so that low voltage due to line drop and other conditions is no longer troublesome. (Aug. 1, page 188.)

Hisey Grinding Attachment

A surface grinding attachment for Hisey machines made by The Hisey-Wolf Machine Co., Cincinnati, Ohio, is interchangeable as a unit with the standard wheel guard equipment, and can be mounted on either right or left side of the machine. The table is 10 x 21 in. and is self-cleaning. (Sept. 12, page 416.)

General Purpose Grinder

The Hammond Machinery Builders Inc., Kalamazoo, Mich., has added a new grinder for tool, casting and general purpose work. One feature of this machine is that the whole spindle assembly can be removed from the pedestal without disturbing any mechanical part. A shatterless glass, adjustable eye shield is standard equipment. It can be supplied with 10, 12, 14 or 16 in. diameter wheels in 1, 2, 3 and 5 hp. capacities. (Sept. 5, page 378.)

Open Side Surface Grinder

An improved model of the large 15 x 15 in. open-side surface grinding machine has been brought out by the Norton Co., Worcester, Mass. The machine mounts a 14 x 6 x 5 in. grinding wheel and will be built in three lengths, 6 ft., 8 ft. and 10 ft. (Aug. 29, page 337.)

Acetylene and Arc Welding Appliances Are Improved

Cutting and Welding Torch

An entirely new cutting and welding torch, known as the Milburn type RIF-A, is made by the Alexander Milburn Co., Baltimore, Md.

The principal parts of this torch are of forged bronze and the tubes nickel, silver, assuring greater strength, rigidity and long life. It has a patented leak-proof, high-pressure valve which is readily accessible. (Aug. 15, page 261.)

Weldolets and Thredolets

Drop-forged weldolets and thredolets are offered by the Bonney Forge & Tool Works, Allentown, Pa., for welded tee junctions in piping. They are designed to make tee joints easily, quickly and economically. Turbulence and friction are said to be reduced by a funnel-shaped outlet, which allows an unrestricted flow from the main pipe into the branch. (Sept. 12, page 416.)

Welding-Cutting Attachment

The Linde Air Products Co., New York, N. Y., has made two additions to its line of Purox medium pressure apparatus for oxy-acetylene welding and cutting. The Purox No. 11 welding torch has a wide welding range extending from the lightest sheet metal up to work as heavy as ½-in.

The Purox No. 21 cutting attachment designed for use with the Purox No. 11 welding torch will cut metal up to 2 in. in thickness. It is furnished with one and two-piece Purox cutting tips. (Aug. 22, page 300.)

Westinghouse Arc Welder

An A.C. arc-welding set designed for operation at between 8.5 and 125 amperes has been added by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. This welder meets the demand for the economical arc welding of thin gage material in aircraft fabrication work. (Aug. 22, page 300.)

Midwest Welding Fittings

The Midwest Piping & Supply Co., Inc., St. Louis, Mo., has placed on the market a line of fittings comprising welding heads, welding sleeves, welding ells and welding saddles. These fittings are available in a variety of sizes. (Sept. 19, page 454.)

Low Melting Brazing Alloy

Handy & Harman, New York, N. Y., have applied for a patent on a new brazing alloy which they call "SILFOS." It contains a small percentage of silver and is described as flowing freely at 1300 deg. Fahr. (Aug. 1, page 190.)

Thomson-Gibb Press Welder

Priced at less than $1,000, the No. 1 press welder has been placed on the market by the Thomson-Gibb Electric Welding Co., Bay City, Mich., for

Being a detailed review of machine tools, small production items and shop equipment announced just prior to the Production Issue of Automotive Industries + + + + +

medium duty automatic spot and projection welding. It is available in throat depths of 12, 18 and 24 in. Transformer capacity 20, 30, or 40 kva. (July 25, page 148.)

Prest-O-Weld Cutting Torch

The Linde Air Products Co., New York, has added a cutting blowpipe and cutting attachment to its line of Prest-O-Weld medium-pressure apparatus of the detachable valve body design. This apparatus includes the Type C-105 cutting blowpipe and the Type CW-105 cutting attachment. (Aug. 22, page 299.)

G. E. Welding Sets

An improved line of single-operator welding sets has been placed on the market by the General Electric Co., Schenectady, N. Y. This has been designated the WD-20 line, covering the 100, 200, 300, 400 and 600-ampere ratings respectively. (Aug. 15, page 262.)

Many Cutting Tool Refinements Have Been Announced Recently

Tap For Two Holes at Once

The Geometric Tool Co. of New Haven, Conn., has added a Combination Solid Adjustable Tap to their line. It is equipped with ground thread chasers for tapping 2 1/16 in.-14 and 2 11/32 in.-14; both U. S. S. form.

The two taps are independent of each other and have individual and separate size adjustment control. Thus both holes may be tapped to the required decimal size. (July 25, page 150.)

B. & S. Cutter Adapters

The Brown & Sharpe Mfg. Co. of Providence, R. I., has recently announced some new cutter adapters, and spiral two-lipped end mills, arbors for shell end mills and screw arbors for use with these adapters.

The adapters are furnished in two different styles for use with milling machine having standardized spindle end, and, also, in one style for use on milling machines having Taper or Threaded-Nose Spindle. (Aug. 22, page 300.)

Brown & Sharpe Slitting Saw

Brown & Sharpe Mfg. Co., Providence, R. I., has recently added to its line of cutters twenty-one sizes of metal slitting saws with side chip clearance. These saws of high-speed steel have been developed to increase production and lessen breakage by permitting chips to be carried out of deep slots without jamming. (Aug. 1, page 188.)

Carboloy Inserted Cutters

The Continental Tool Division of the Ex-Cell-O Aircraft & Tool Corp., Detroit, Mich., has developed a new type of milling cutter, equally adaptable for the use of high-speed steel, Stellite or tungsten carbide blades. This cutter is known as the Type RC Roughing and Finishing Milling Cutter, when used with Carboloy tipped blades and Type R when used with high-speed steel or Stellite blades. The new cutters are available from 5 in. diameter up to 24 in. diameter and larger. (Aug. 29, page 338.)

J-Metal for Cutting Tools

J - metal is a special grade of Haynes stellite developed for cutting cast iron, semi-steel and steel, by Haynes Stellite Co., Kokomo, Ind. (Sept. 19, page 454.)

De Luxe Reamer Sharpener

A Universal reamer sharpener with a capacity from ⅝ to 1⅞ in. diameter and up to 18 in. in length is made by the De Luxe Products Corp., LaPorte, Ind. It will hand straight fluted or spiral reamers. (Sept. 5, page 380.)

Tungsten Carbide Saw

Cutting difficult stock such as wallboard, composition fibre insulation and similar material, is being successfully accomplished by a new Widia Tungsten-Carbide tipped inserted tooth saw made by the Simonds Saw and Steel Co., Fitchburg, Mass. (July 25, page 152.)

Ramet Toolpak

The Ramet Toolpak, consisting of five small Ramet-tipped tools of tantalum carbide, a rugged tool holder and a special grinding wheel, all packed in a finely finished wooden case, has been developed by the Ramet Corp. of America, North Chicago, Ill. (Sept. 19, page 456.)

Larger and Better Lathes Have Been Recent Plant Contributions

10 Ft. Cincinnati Lathe

The 20 in. x 10. ft. Cincinnati lathes with the motor mounted inside of the leg fitted complete with hexagon turret on bed, power feed, square tool block in the compound rest and a four jaw independent chuck are a recent offering of the Cincinnati Lathe & Tool Co., Cincinnati, Ohio.

Whenever various diameters are also to be turned, the use of the four-way tool block in the compound rest enables many different operations to be done without stopping the lathe to change the tools. (August 8, page 224.)

LeBlond Automatic Lathe

An automatic lathe for rough and finish facing or rough and finish forming has been placed on the market by the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. It is suitable for a wide variety of parts such as: Gear shift levers, piston grooving, ball joints, etc. It is so constructed that precision facing and forming work can be produced at a maximum rate with a minimum of effort.

This machine has a six-speed, Timken-equipped geared head and spindle speeds up to 1000 r.p.m. may be obtained. (Aug. 29, page 340.)

Improved Gages and Instruments Simplify Inspection Problems

Zeiss Cam Checking Device

Carl Zeiss, who is represented in this country by the George Scherr Co., 128 Lafayette Street, New York City, has placed on the market an optical cam checking device. It consists of an accurately scraped surface plate, with two parallel T slots, an optical dividing head and tailstock and a measuring microscope. The two T slots being parallel will insure the proper alignment between dividing head and tailstock, as well as measuring microscope respectively.

The outstanding feature of the measuring microscope for checking the rise or fall of the cam is that the reading is obtained directly from a scale, without the use of other standards or masters. (Sept. 5, page 376.)

Coats Mikrotast Snap Gage

A comparator snap gage fitted with a Mikrotast indicator was recently placed on the market by the Coats Machine Tool Co., New York, N. Y.

A considerable size range is available through adjustment of the lower anvil towards the snap gage center. These gages have the advantage of being applicable also to revolving work, the "Widia" tungsten carbide pads resisting the abrasive action of rotating bodies. (Aug. 1, page 190.)

Axle and Ram Recorder

An instrument for measuring and recording the force and pressure exerted on a hydraulic ram at all points of its stroke has been placed on the market by the Dobbie-McInnes & Clyde, Ltd., 57 Bothwell St., Glasgow. While it is principally employed in connection with axle presses, it is suitable for all types of hydraulic presses and testing machines, and consists of three main units: Gage, recorder and reducing gear. (Sept. 5, page 375.)

Wells Rapid Thread Gage

A precision inspection gage for rapid gaging of threaded parts has been placed on the market by the Wells Mfg. Co., Greenfield, Mass. It is of the comparator type and provided with a device for magnifying readings over 300 times. (Sept. 19, page 456.)

Toledo Spring Testing Gage

A new auto-gage for compression coil springs has been placed on the market by Toledo Precision Devices, Inc., a subsidiary of the Toledo Scale Co., Toledo, Ohio. Springs are discharged through a swinging chute, those of the proper stiffness dropping into one bin, those which are too stiff into another bin, and those not stiff enough into a third bin. (Aug. 15, page 261.)

Ferner Comparator

A Micro-Indicator stand designed especially for checking the diameter and roundness of steel balls has been placed on the market in the United States and Canada by the Société Genevoise d'Instruments de Physique of Geneva, Switzerland, through their American agents, The R. Y. Ferner Co., Investment Bldg., Washington, D. C. (Aug. 29, page 340.)

Height Gage Attachment

The Brown & Sharpe Manufacturing Co., Providence, R. I., has added depth-gage attachments Nos. 585A and 585B for use with Vernier height gages No. 585 in both the 10-in. and 18-in. heights. (Aug. 22, page 204.)

Equipment Announcements Have Shown Many Refinements

Metalwash Drying Machine

A low-heat, continuous-drying machine has been improved by the Metalwash Machinery Co., Inc., New York, N. Y., to take care of work coming from cold or hot rinse tanks, requiring quick drying of miscellaneous metal parts, replacing sawdust drying. It is a relatively small, compact unit, arranged in two drying chambers for either hot or combination cold and hot blast drying. (Aug. 15, page 261.)

Constant Displacement Motor

A maximum pressure range of 1500-1750 lb. per sq. in. is available with the type RQ-2 motor recently placed on the market by the Oilgear Co., Milwaukee, Wis. When used in combination with an Oilgear variable delivery pump will provide an ideal variable speed transmission. The displacement is 2.1 cu. in. per revolution. Maximum speed 860 r.p.m. Net weight 200 lb. (Aug. 15, page 261.)

Hydraulic Relief Valve

A "balanced" hydraulic relief valve for machine tools and other applications has been announced by Vickers, Inc., Detroit, Mich. Instead of the customary spring-loaded construction, it is operated by a piston that is in hydraulic balance regardless of the initial oil pressure and the pressure for which the valve is set.

The Vickers Hydraulic Relief Valve (balanced) is made in two sizes—for ¾ in. and 1¼ in. pipe connections. Their capacities are 0 to 15 gal. per min. and 10 to 40 gal. per min. respectively. (August 8, page 224.)

"Fulflo By-Pass Valve"

A non-chattering piston type oil relief valve, or by-pass, has been placed on the market by Fulflo Specialties Co., Blanchester, Ohio. It is made in pipe sizes from ⅜ in. to 1¼ in., and suitable for pressures from 20 lb. to 120 lb. Adjustment can be made by removing the cap and turning the adjustment screw at top. (Aug. 15, page 262.)

Monobloc Pumping Unit

To fill the need for a centrifugal pump of good efficiency, low initial cost and low maintenance expense—the Monobloc (Type D) Centrifugal unit was recently placed on the market by the Worthington Pump & Machinery Corp., Harrison, N. J. It is bolted to the extended motor frame, and the impeller is mounted on the end of the continuous motor shaft. (Aug. 22, page 299.)

Electro-Hydraulic Transmission

The American Engineering Co., Philadelphia, Pa., makes a small, compact 5-hp. electro-hydraulic transmission. The transmission will develop full rated torque at any speed. At maximum speed the transmission will develop 5 hp. continuously. Pump and motor are multi-cylindered and handle the fluid in a smooth continuous stream. The entire transmission, including motor, is only 30 in. long, 14 in. wide and 16 in. high. (Sept. 5, page 378.)

Automatic Chuck Guard

Heald fixtures for high production internal grinding obviate the necessity of opening the chuck guard each time a piece is loaded. In some cases, however, side loading balloon type fixtures are required. From this production may suffer because of the increase in handling time due to having to open and close the chuck guard.

To eliminate this loss and effect a saving in cost per piece on this type of work, the Heald Machine Co., Worcester, Mass., has developed an auto-

matic chuck guard which is applicable to all Heald No. 72A Internals where a standard guard is used. It can be readily applied to machines already in the field. (Sept. 12, page 413.)

EC&M Motor Starter

Another type ZO across-the-line motor starter has been added by the Electric Controller & Mfg. Co., Cleveland, Ohio. This No. 2 unit is a companion to the well-known No. 1 starter. Like the latter, it is a self-contained unit, totally inclosed with oil-immersed main and control circuit contacts and vapor-proof overload relays. (Sept. 5, page 378.)

Cushman Electric Chuck

A line of "Cushmatic" electric chucks has been placed on the market by the Cushman Chuck Co., Hartford, Conn. It has two distinct units, each of which is complete in itself. They are connected by a draw bar and a control box arranged to regulate its pull. Flexibility of the grip through resistance in the line is obtained by using a special rheostat control. (Sept. 5, page 380.)

Union Electric Power Chuck

An electric motor-driven power chuck for lathes has been added by the Union Mfg. Co., New Britain, Conn. It is a patented chuck of the wedge type, the body being of forged steel with a one-piece hardened steel face which also forms ways for the master jaws. The electrical equipment exclusive of the chuck can be used on any type of air-operated chuck where any user has air chucks which he desires to change over to electric. (Sept. 12, page 414.)

Spiral Bevel Speed Reducer

A new vertical spiral bevel speed reducer has been added by the D. O. James Manufacturing Co., Chicago, Ill. Where large ratios of reduction are required this type of reducer is made integral with a planetary reduction unit. (Aug. 8, page 226.)

B & S Geared Pump

The Brown & Sharpe Mfg. Co., Providence, R. I., added the No. 4 pump of larger capacity than the Nos. 1, 2 and 3 Geared Pumps in their regular line. This pump has a capacity of 15 g.p.m. at 500 r.p.m. with a corresponding increase in discharge of 3 g.p.m. for each 100 r.p.m. increase up to a maximum of 30 g.p.m. at 1000 r.p.m. (Sept. 12, page 416.)

Celoron Silent Gears

Time tested in automobile engine construction, Celoron gears are being introduced in the field of factory equipment by the makers, Continental-Diamond Fibre Co., Newark, Del. Chief claims for Celoron gears are: quietness, long life and waterproof qualities. (Sept. 12, page 416.)

Hammond Multi-V Belt Drive

A variable speed pulley capable of transmitting up to 15 hp. capacity has been placed on the market by the Hammond Machinery Builders, Kalamazoo, Mich. It has a ratio of 1 1/3 to 1 (greater ratios if two or more pulleys used), which makes it possible to give an unlimited number of speeds in this ratio. (Oct. 3, page 516.)

Schneible Dust Collector

A wet type dust collector for industrial purposes has been placed on the market by Claude Schneible, Chicago, Ill. Its design has been simplified to eliminate moving parts, spray nozzles and pockets.

This equipment is capable of handling air saturated with moisture and hot gases or fumes. (Sept. 5, page 375.)

Pour-Klean Container

Geuder, Paeschke & Frey Co., Milwaukee, Wis., has placed on the market a pouring container for paints, varnishes, oils, chemicals and other liquids. When not in use the spout telescopes inside the container top. When in use, the spout is simply pulled out to full length. (July 25, page 152.)

Howell Motors

Howell Electric Motors Co., Howell, Mich., announces a new double-sealed, ball bearing as standard on all Red Band motors. The bearing is packed with a congealed oil and completely sealed in a dust-proof room at the point of manufacture. (August 8, page 223.)

Explosion-Proof A. C. Starter

An explosion-proof, across-the-line, automatic starter for A.C. squirrel-cage induction motors is made by Cutler-Hammer, Inc., Milwaukee, Wis. Distinguishing this starter from similar explosion-proof equipment is the immersion in oil of its new thermal overload mechanism. It is designed in keeping with the latest requirements of the Underwriters Laboratories for Class 1, Group D, Hazardous Locations. (Sept. 12, page 413.)

Beaver Portable Pipe Machine

The Beaver Model A pipe machine, a portable unit for cutting, threading and reaming ½ to 2 in. pipe steel, wrought iron, brass or cast iron, has been placed on the market by the Borden Co., Warren, Ohio. (Aug. 22, page 304.)

Multiple Disk Magnetic Clutch

An improved multiple disk magnetic clutch with many special features is offered by the Magnetic Mfg. Co., Milwaukee, Wis. The chief claim for this clutch is simplicity, elimination of moving parts, and less space required for installation. (Aug. 29, page 338.)

Hammond Composition Feeder

An automatic composition feeder has been placed on the market by the Hammond Machinery Builders, Kalamazoo, Mich., for use on full automatic, semi-automatic, hand-polishing and buffing machines now in service. It is operated by means of compressed air. (Sept. 19, page 456.)

B. & S. V Blocks-and-Clamps

V Blocks-and-Clamps No. 750B and V Block 750C have been added by the Brown & Sharpe Mfg. Co., Providence, R. I. Each block is of hardened steel 2½ in. long, 2¾ in. wide and 2 in. high. Made and sold only in numbered pairs. Clamps are drop forged and clamp screws are hardened. (August 8, page 223.)

Hanna Special Riveters

Two single purpose riveters have been developed by the Hanna Engineering Works, Chicago, Ill., for fabricating wheels of agricultural implements. (August 8, page 226.)

Portable Tools Are a Big Factor in Production

Gas-Heated Soldering Iron

Increased economy is one of the features claimed for the "Torchiron" gas-heated soldering iron recently introduced by the Reliance Specialties Manufacturing Co., New York, N. Y. As the name implies, the "Torchiron" may be used as a torch as well as an iron, merely by removing the copper head. (Aug. 1, page 190.)

Thor Spray Gun

The Binks Manufacturing Co., Chicago, Ill., has brought out the Thor Model 2, spray painting and finishing gun for spraying any material on any surface. This gun comes in two models, both identical except that on one the spray adjustment is made by a removable key, and on the other by a stationary control. (Aug. 22, page 304.)

Wappet Slow Speed Hole Saw

Type 145 Wappet drill placed on the market by Wappet, Inc., division of Simonds Saw and Steel Co., Pittsburgh, Pa., is designed for use with hole saws and drilling hard metals.

Its capacity is up to ½-in. diameter in steel and 3-in. diameter hole saw.

Full load speed is 200 r.p.m. Net weight, 10 lb. (Sept. 5, page 376.)

Hercules Drill and Reamer

According to a recent announcement, the Buckeye Portable Tool Co., Dayton, Ohio, has added the Hercules No. 287 heavy-duty drill and reamer to its present line of portable air tools.

It is also made for nut driving. Its weight is 40 lb. Feed is controlled by a ratchet wrench; a square handle or breast plate can be used in place of the ratchet. (July 25, page 152.)

Wappet 1/2 in. Utility Drill

For general maintenance work, Wappet, Inc., division of Simonds Saw and Steel Co., Pittsburgh, Pa., offers the Wappet Red Streak standard duty drill type 121 with a capacity of ½-in. in steel. The spade handle swivels to any position and the pipe handle is removable for drilling in close corners. (Sept. 5, page 376.)

Presses, Millers, Swagers and Forming Machines Are Recent Offerings

Federal 65-Ton Press

The Federal Press Co., Elkhart, Ind., have announced the addition of a 65-ton model to their line. The No. 6 is built in both geared and flywheel types with an integral back gear bracket in geared machines. Timken roller bearings are used in the mounting of the back shaft on the geared presses. (August 8, 223.)

Langelier Swaging Machine

A line of swaging machines incorporating many radical improvements has been offered by the Langelier Mfg. Co., Providence, R. I.

The spindle which is now mounted on Timken bearings produces improvements in the operation of the machine. The three larger size machines of 5 in., 7 in. and 9 in. maximum tube capacity, can be furnished either with Timken bearing spindles or with plain bearings. The plain bearing type for these three machines, however, has bronze bushings in the head and an outboard bearing with the flywheel mounted between the two. (Sept. 12, page 416.)

Kane & Roach Forming Machine

One of the new cold-roll forming machines recently placed on the market by Kane & Roach, Inc., Syracuse, N. Y., has wide use in the automotive field. The illustration shows a special design for producing a patented retainer strip for gypsum boards. This machine is of standard construction, having 1½ in. shafts, 4⅛ in. diameter rolls, 8 in. horizontal centers, and a roll space of 6 in. (July 25, page 150.)

Pyramid-Type Bending Roll

A pyramid-type bending roll was developed by the Cleveland Punch & Shear Works Co., Cleveland, Ohio, to meet the demand for rolling small-diameter cylinders of heavy material.

Some of the additional features incorporated in this roll include an air-operated drop hinge to allow the cylinder to be removed from the roll, individual motor drive for operating the rolls and for raising and lowering the top roll. (Aug. 22, page 304.)

Knee-Type, Milling Machines

A complete new series of Knee-type Milwaukee milling machines has been announced by Kearney & Trecker Corp., Milwaukee, Wis. Features include a greatly broadened range of spindle speeds from 15 to 1500 r.p.m.; feeds from ¼ in. to 60 in. per minute, a new center-bearing spindle with worm drive, a Sponson type knee, and a stabilized column. (August 8, page 223.)

Van Norman Duplex Miller

Power vertical feed and a pivotally adjustable cutter head distinguish the No. 21 duplex milling machine which has been brought out by the Van Norman Machine Tool Co., Springfield, Mass. Sixteen feed changes for the vertical, cross and longitudinal movements of the machine are obtained through a gear box on the right hand side of the column. Motor required is 3 hp., 1150 r.p.m. (Sept. 5, page 375.)

Vertical Milling Machine

A new Router and Vertical Milling Machine for brass, steel and cast iron has been placed on the market by Reed-Prentice Corp., Worcester, Mass. This is a new design of the No. 2 size which has been popular with stamp, stencil and light die manufacturers. Working surface is 18 x 8⅞ in. Net weight is 1650 lb. (Aug. 8, page 228.)

Langelier No. 8 Swager

An improved No. 8 swaging machine, which is said to be the largest of its kind, has been completed by the Langelier Mfg. Co., Providence, R. I. It is capable of tapering and reducing work up to a finished diameter of 9 in., occupies a floor space approximately 6 ft. wide x 16 ft. long, and weighs approximately 40,000 lb. Rapid traverse speed is at full pump delivery, which produces approximately 240 in. per min., and the feed rate is adjustable from 0 in. to 240 in. per min. (Sept. 5, page 378.)

Allsteel Making Verson Presses

The well-known line of Verson steel presses now is being manufactured by the Allsteel Press Co., Chicago, Ill. Under the new setup, the presses are of all steel, welded construction, built up from plates. (July 25, page 152.)

Cut-Off Machines and Gear Shapers for More and Better Work

Rickert-Shafer Cutting-off Machine

Cutting off pipe nipples, rods, tubing, etc., is said to be accomplished with facility on the cutting-off machine added by the Rickert-Shafer Co., Erie, Pa. The cam-controlled method of feeding and the rigid mounting of the oscillating arm are said to eliminate chatter, thereby adding to the life of the tool as well as to the quality of the work produced. (Aug. 29, page 342.)

Campbell Cut-Off Machine

An abrasive disk cut-off machine for extra wide stock has been added by Andrew C. Campbell, Inc., Bridgeport, Conn. It will cut materials of certain characteristics up to 1 in. thick and 16 in. wide at the rate of 2 to 12 seconds per cut. (August 8, page 224.)

High-Speed Gear Shapers

When arranged for motor drive, the Fellows high-speed gear shaper is now provided with an automatic electrical control, according to a recent announcement by The Fellows Gear Shaper Co., Springfield, Vt. The machine is provided with a push button station, mounted on an auxiliary bracket.

The machine is stopped automatically when it has finished its complete cycle through an electrical control switch attached to an extension on the rear of the motor bracket. (Aug. 1, page 188.)

Materials Handling Problems Are Becoming Easier to Solve

W-H Industrial Truck

The RT series 9-in. lift truck is offered by the Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y., for use in connection with the handling of skids of various underneath clearances. A truck can be obtained which will readily go under the lowest skid, and this same truck can be utilized for much higher skids also. (Oct. 3, page 516.)

New Ball Transfer

A new type of handling equipment, known as the Mathews Ball Transfer, has been designed by the Mathews Conveyer Co., Ellwood City, Pa., to accommodate the movement of any objects having smooth, hard surfaces such as sheets or strips in any direction on a horizontal plane. This device is made up with a large hardened steel ball which rotates on a series of smaller balls held in a cupped base. (July 25, page 148.)

New Cadmium Coloring

Udylite Process Co., Detroit, Mich., licensor of the Udylite process of cadmium plating, announces a new finish, Udyblack. This finish is particularly adaptable to articles of ornamental iron and to cast and sandblast surfaces.

It will produce either a jet black or a steel gray against a high-lighted bright Udylite, depending on the method of relieving. (Aug. 8, page 226.)

Cleveland 5-Ton Tramrail

A five-ton electric Tramrail has been added by the Cleveland Electric Tramrail (division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio). The five-ton or 5100 Type Tramrail is (like the 2100 type) based on a rail section having the raised tread, designed and rolled specially for the purpose. (Aug. 29, page 342.)

Clark 3-Ton "Trucktier"

A tiering truck that steers with all four wheels, drives from the rear wheels and is powered with a tractor-type gas engine capable of twenty-four hours' continuous operation is announced by the Clark Tructractor Co., Battle Creek, Mich. The turning radius is 94 in. (Sept. 19, page 454.)

Drilling and Tapping Operations Are Being Simplified

Drilling and Centering Machine

To meet the demand for a substantial, powerful and rigid centering equipment, the Sunstrand Machine Tool Co., Rockford, Ill., has placed on the market the No. 56 D.E. Drilling and Centering Machine. It is more than a centering machine, as reaming, spot facing and tapping operations can be performed equally as efficiently, especially where two ends of a part can be machined simultaneously.

Capacity: Two one-in. drills in steel. Work diameter, 6 in., either round or hexagonal. Length, up to 72 in., depending upon size of machine. (Aug. 29, page 342.)

Center Feed Drill Unit

The Baush Machine Tool Co., Springfield, Mass., has added to its line of fixed and adjustable center multiple spindle drilling machines a new drilling unit which will be furnished in various sizes. The features of this unit are: Compactness, center feed, and all-electric machine operation. The drilling speed is changed by changing the gears. Feed is changed by changing the pick-off gears. (Aug. 29, page 340.)

Natco Multiple Driller and Tapper

A new Natco "Multiple," the Model D-5, announced by the National Automatic Tool Co., Richmond, Ind., is designed as a universal machine with a wide range of adjustments enabling it to handle work of varying sizes. It is built as a driller only, as a tapper only, or as a combination driller and tapper. It has a capacity of 10¼ in. drills and 10 3/16 taps in mild steel. (Aug. 29, page 338.)

Buffalo Simplex Drill

Meeting the requirements for a versatile drill, the Buffalo Forge Co., Buffalo, N. Y., placed on the market the 13½-in. Simplex drill with four spindle speeds: 855, 1210, 2380 and 3400 r.p.m. Can be supplied with either 1/6 or ¼ hp. motor. Bench space required, 10 x 9 in. Net weight, 83 lb. (Sept. 12, page 416.)

Buffalo 16-in. Sliding Head Drill

The Buffalo Forge Co., Buffalo, N. Y., has placed on the market the 16-in. sliding head drill. Capacity in steel, 9/16 in.; in iron, ⅞ in., and has a vertical range of 8½ in. The motor is a standard ball-bearing, vertical motor of 1/3 to ¾ hp. (Sept. 19, page 454.)

Buffalo Heavy Duty Drill

A 10 in. heavy duty drill added to the line of the Buffalo Forge Co., Buffalo, N. Y., has a capacity of ½ in. in cast iron and three spindle speeds: 3000, 1750 and 850 r.p.m. A ¼-hp., 1725-r.p.m. vertical ball bearing motor drives by means of balanced 3-step V-belt. (Sept. 5, page 380.)

Miscellaneous

Peerless Burring Machine

City Machine & Tool Works, Dayton, Ohio, have developed a Peerless No. 3 Special burring machine. This machine utilizes a continuous but variable speed rotation of turret, and after set-up, the operation resolves itself into a matter of loading and unloading the parts into the turret fixture. (Aug. 22, page 299.)

Artos Combination Machine

A high-production combination measuring, cutting and stripping machine for long length cords and wires has been developed by the Artos Engineering Co., Milwaukee, Wis. The machine is adjustable for any length from 12 in. minimum to 20 ft. maximum. Stripping length is adjustable from ¼ up to 2 in. on either end. Production capacity is 1800 pieces per hour for lengths from 12 in. to 10 ft. and 900 pieces per hour for lengths from 10 ft. to 20 ft. (Aug. 22, page 300.)

Neutral Position Workhead

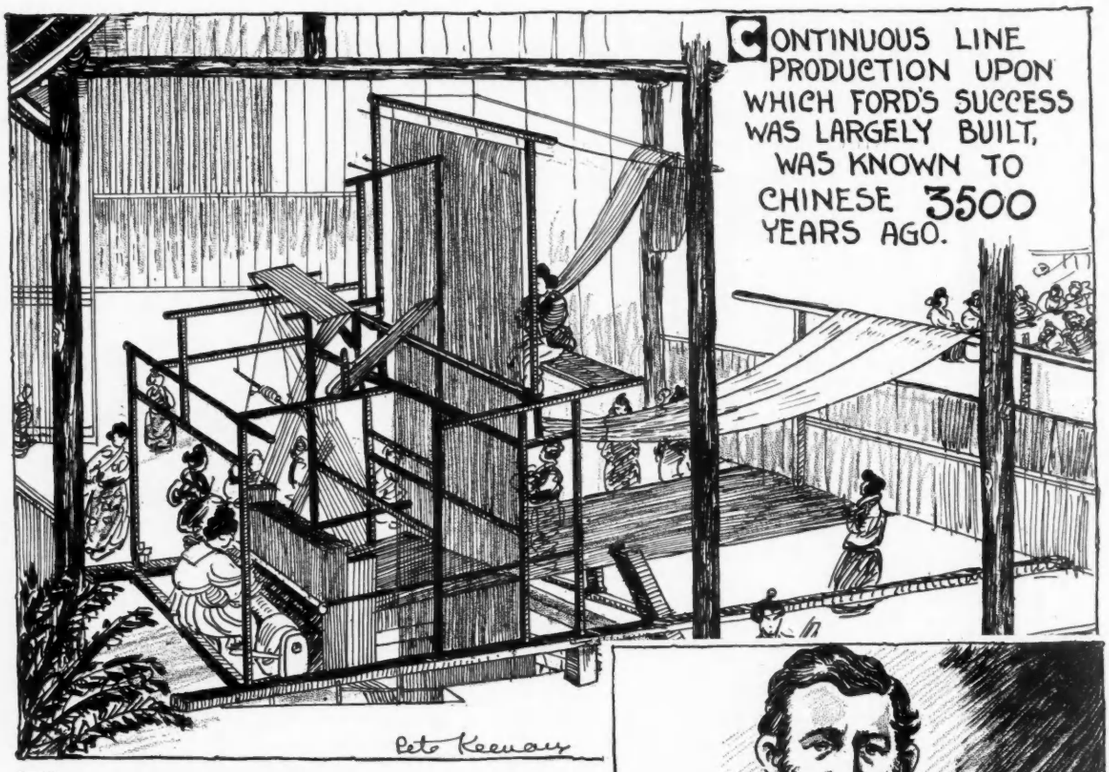
A new type of neutral arrangement for the workhead spindle has been developed by The Heald Machine Co., Worcester, Mass. The ability to free the workhead from its driving mechanism, so it can be turned by hand, is of great value in setting up a machine, and is almost a necessity when balloon type fixtures are used. (Sept. 12, page 413.)

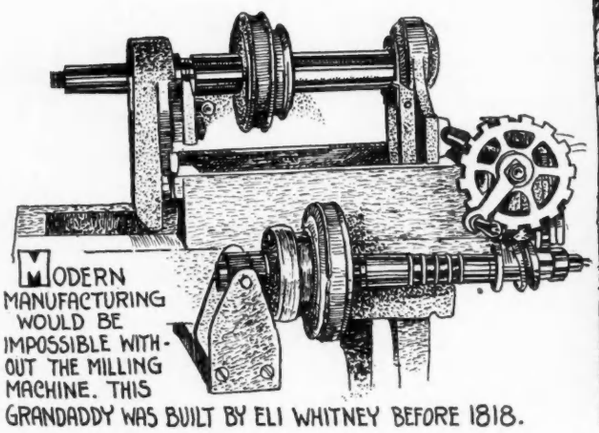
New Babbitt Metal

A new babbitt metal has been placed on the market by the Bunting Brass & Bronze Co., Toledo, Ohio. It is a lead-base product packaged in a wooden box containing 10 5-lb. bars.

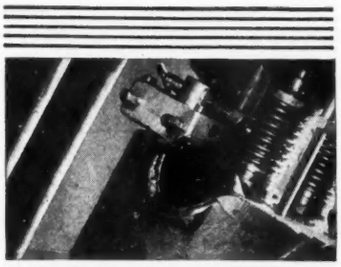
(Turn to page 630, please)

Production Oddities—By Pete Keenan

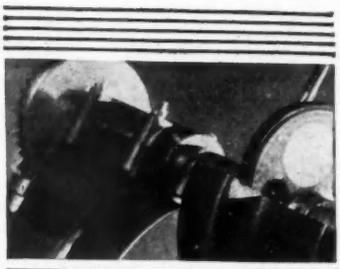



MODERN MANUFACTURING WOULD BE IMPOSSIBLE WITHOUT THE MILLING MACHINE. THIS GRANDADDY WAS BUILT BY ELI WHITNEY BEFORE 1818.

Correspondence about "Automotive Oddities" is invited. Contributions used will receive editorial mention when practicable. If you are interested in the source of, or the reason for, a particular "Oddity," ask the editorial department of Automotive Industries about it.



NEWS OF THE INDUSTRY



Stutz Lays Plans For 1932 Lines

Company Is Reorganized And Shows a Profit

INDIANAPOLIS, Oct. 15—The Stutz Motor Car Co. of America, Inc., today announced that three series of cars would be offered by that firm this year with the first formal showing coming at the time of the New York Automobile Salon. The new line will start at a new low base price for cars bearing the Stutz name with a sedan listing at $1,620, f.o.b. Indianapolis.

Leading the new cars will be the DV-32 series which was introduced last year and which has been improved considerably in the development of an unusually quiet double overhead camshaft, 32-valve, eight-cylinder engine, the horsepower remains practically the same, 160, with a slight increase over last year due to refinements in the engine design. This series will include several custom models with bodies by LeBaron, Weymann, Brunn, Rollston and other leading coach makers, and will list upward from a base price around $5,000. A Super-Bearcat model will be mounted on a 116-in. wheelbase chassis.

The companion series to the large line will be mounted on the same chassis, but will be powered by a 16-valve, eight-cylinder engine of somewhat less horsepower. This series has been designated the SV-16 series, and will list from around $3,000 upward. The bodies will show much improvement in insulation against sound and heat.

Little data, other than the new light car series LAA, will embody conventional Stutz features have been announced except that it will be mounted on a 127¼-in. wheelbase chassis. Body lines throughout the three series will be refined.

The firm's financial report shows that a gross profit of $100,000 as of July 31 gives a net of $20,000 after all subsidiary losses and all costs are charged off.

NUMEROUS bank failures during the past few weeks have brought their honey of satisfaction to some dealers who have sent telegrams to the factory something like this: "Sorry, cannot accept sight draft on consigned cars. My bank has suspended!" But it's a tough price to pay for irony.

When the motorcycle escort of New York's finest brought Andre Citroen from the docks to the Hotel Plaza, when he arrived in this country on Tuesday, we didn't get any closer to him than if he'd been in Paris. On the train which later rushed him to Washington for dinner with President Hoover on the following day, it was a different story. Mr. Citroen had settled down for a cozy chat with Pierre Bourdon-Michelin, chief engineer of the *Maison Michelin*, who accompanied him to this country. Quite accidentally (you can believe it or not) we had a chair just two spaces removed. Question: To interrupt or not to interrupt. At this point, M. Citroen shows friendly interest in very-American infant across the aisle, so we decided that he was a human being and chucked a name-card Citroenward. An hour's chat ensued; not for publication. In fact, M. Citroen decided immediately that any interview should proceed in reverse, and if the story could be printed the by-line should read (after the manner of the *Saturdayeveningpost*): "What I Know About the American Automobile Industry," by H. H., as told to Andre Citroen. Pretty soon, M. Citroen ducked into his compartment and produced a leather attache case, which it turned out, was one of several which he had made for his expedition to the Sahara in 1922. The way it was referred to, you could almost hear a sirocco, or whatever they call them, whistling outside. From the case there came three books illustrating various aspects of Citroen activities. One picture, of which M. Citroen seemed particularly proud, showed the reception given to Charles Lindbergh at the Citroen plants when he first arrived in Paris.

There was never a greater apostle of illumination than the grizzled, dynamic French automobile manufacturer.

We were shown pictures of most of the landmarks of Paris, illuminated at night with gigantic floodlights, because M.

(Turn to page 627)

THE NEWS TRAILER

Safety Congress Meets in Chicago

Speakers Divide Blame for Vehicle Accidents

CHICAGO, Oct. 15—Sectional meetings today and the manufacturers' Mardi Gras tonight brought to a close what has been pronounced one of the most successful National Safety Congresses in years. Divisional meetings were held, as were the main sessions, in the Stevens Hotel.

The speakers at the meetings divided their loyalty when it came to fixing responsibility for automobile accidents, some denouncing automobiles in poor mechanical condition, some blaming the majority of accidents on the private motorist, others shifting responsibility for mishaps to the fleet or commercial owner.

One of the outstanding addresses of the congress was that of Emil A. Dannemann, division manager, Parmelee Transportation System. He emphasized the point that the average commercial vehicle is better maintained mechanically than the average private car. He stated that in negligence cases in court awards in damage suits usually run one-third to fifty per cent higher against commercial vehicle operators than against private owners. An investigation, he asserted, will soon uncover the fact that there is more carelessness among individually owned and driver-owned cars than among employees of fleets. He deplored the lack of effort to control the pedestrian.

"The history of motor vehicle accidents show the necessity for what may be termed drastic measures if the needless tragedies resulting in loss of life and limb are to be prevented," said C. E. Hill, general safety agent, New York Central Lines, in an address calculated to urge the adoption of driver license laws by all states. He urged a standardization and classification to weed out the careless and incompetent driver.

Men of the Industry and What They Are Doing

Brill Promotes Guernsey

The J. G. Brill Co., Philadelphia, has announced that on Oct. 1 all Brill engineering activities were placed under the direction of Charles O. Guernsey, as chief engineer of the parent and its subsidiary companies.

Mr. Guernsey has been connected with the Brill organization since 1923. For ten years previously he was affiliated with the Service Motor Truck Co., Wabash, Ind., as chief engineer and later as vice-president in charge of the company's railroad division, the activities of which were transferred to the Brill Company in 1923. Mr. Guernsey was then appointed chief engineer, automotive car division.

Keeley to Assist Bendix

R. W. Keeley, who has been resident manager of the Eclipse Machine Co., Ltd., Walkerville, Ont., since they were established there in 1920, has been made assistant to Vincent Bendix, president of the Bendix Aviation Corp. Mr. Keeley will have charge of all foreign plants, including the Walkerville factory.

Wiethoff Joins G. M. Graham

F. L. Wiethoff, formerly assistant general sales manager, Willys-Overland, has been appointed sales manager of the company being formed by George M. Graham for the manufacture in Detroit of a new, low-priced, six-cylinder car.

Holt Joins Heintz

Glen G. Holt, who was associated with George H. Hannum in the Hannum Mfg. Co., and the Lavine Gear Co., has joined the Heintz Mfg. Co., Philadelphia, of which Mr. Hannum was recently appointed general manager. Mr. Holt will act as contact man for the Heintz Co.

Bouton Leaves Indian

The resignation of W. Stanley Bouton, as assistant sales manager, is announced by the Indian Motocycle Co., Springfield, Mass., through James A. Wright, general sales manager. Mr. Bouton had been with Indian since 1919 and has left to take up another type of work.

Seiberlings on Tour

F. A. Seiberling, president of the Seiberling Rubber Co., has started on a tour covering practically every key city in the country, during which he will address more than 4000 tire dealers.

This trip is being undertaken to introduce the new Seiberling duothread, air-cooled tire. He is accompanied on this trip by his son, J. P. Seiberling, who will also speak on the market for Seiberling products, and by Harvey B. Stout, factory representative, who will present dealer development plans and the company program for wider distribution.

Graves Joins Century

Barney Graves, former vice-president and general manager of the Yellow Cab Co. of Philadelphia, has become associated with Century Air Lines, Inc., in charge of the company's system of ground transportation, it has been announced.

Blum to Discuss Plating

Dr. William Blum, Bureau of Standards chemist, will talk on "The Status of Chromium Plating" at a public meeting of the Franklin Institute of Pennsylvania, to be held in Philadelphia, Thursday, Nov. 5.

Graham Names Two

J. W. Dunn has been named purchasing agent, and J. W. Grant assistant purchasing agent of the new Graham-Paige plant at Walkerville, Ont.

Michigan Employment Off

DETROIT, Oct. 13—Automobile employment in the state of Michigan as of Sept. 15 showed a total of 149,427, according to a report by the State Department of Labor and Industry, as compared with 150,912 in August and 182,605 in September, 1930, based on the reports of 72 companies.

Aggregate weekly payroll was $3,128,569 in September, $3,617,641 in August, and $4,994,723 in September, 1930.

Average weekly earnings per capita were $20.94 in September $23.97 in August, and $27.35 in September last year.

Willys Reduces Prices

TOLEDO, Oct. 14—Price reductions of from 10 to 25 per cent on the Willys lines of cars were announced today by L. A. Miller, president of the Willys-Overland Co. Willys-Overland, Willys Six, and Willys-Knight were all affected. On the Willys-Overland line the coach was reduced $71, the four-passenger coupe, $136, and the two-passenge coupe, $121.

Leases Larger Quarters

INDIANAPOLIS, Oct. 14 — Automotive Hardware, Inc., has leased 10,000 sq. ft. of floor space in the Industrial Building here, and will move into its new quarters about Nov. 1.

Ford Making Trucks at Dagenham Plant

LONDON, Oct. 12 (*by cable to Automotive Industries*)—The first truck units have been assembled at the new Dagenham plant of Ford Motor Co., Ltd., of England, and production of passenger cars is expected to be under way before the end of this year, according to an announcement made here today.

The new plant when fully in operation will supply Ford products to a large part of Europe.

The Dagenham plant, which is the largest automobile factory in the world outside of the U. S. A., occupies an area of 110 acres with an additional tract of 484 acres adjoining reserved for expansion, and it has a frontage of nearly one-half mile on the Thames River, permitting the descent of raw material and the shipment of finished cars and parts by water as well as by rail.

The assembly and manufacturing buildings are each 1000 ft. long and 300 ft. wide, being separated by a covered railway court 80 ft. wide. A 500-ton blast furnace, the first of its kind built in southern England, a 500-ton sintering plant, a battery of 45 by-product coke ovens capable of carbonizing 800 tons of coal a day, and a huge dry quenching plant are among the unusual features of the Dagenham works.

Hercules Adds to Line

CANTON, OHIO, Oct. 14—The Hercules Motors Corp. is now manufacturing a line of small four-cylinder engines and power units designated as the Hercules IX Series. Models are available in the following bores, strokes and displacements:

Model	Size	Displacement
IXA	3 in. x 4 in.	113.1 cu. in.
IXB	3¼ in. x 4 in.	132.7 cu. in.

The IX Series engines and power units embody the usual Hercules features of design. They are designed and built for heavy-duty purposes and are arranged to accommodate all modern accessories.

Aside from their heavy-duty character, these engines have been developed also for high-speed operation for automotive and marine purposes. We understand that they will shortly make their appearance in the marine engine field, in which conversions will be offered by two marine engine builders.

Offers New Visor

DETROIT, Oct. 12—American Forging & Socket Co., Pontiac, is offering an adjustable interior visor designed to fit all cars. It is finished in a beige material and is attached to top wooden members. Adjustable visor brackets without the visor panels are also being offered to body manufacturers.

Dealers' Net Profits Rise With Smaller Sales Volume, R. H. Grant Tells Group

By Don Blanchard

PITTSBURGH, Oct. 12—Two years of trying to get dealer expense within dealer income is now bearing fruit, R. H. Grant, vice-president of the General Motors Corp., told the annual convention of the Pennsylvania Automotive Association meeting here in a two-day session. Chevrolet dealers for 1931 to date on a smaller volume of business, are $10,000,000 ahead in net profit. Oakland and Pontiac dealers, have improved their profit position by $5,000,000 and Buick dealers have cut $8,000,000 out of their fixed expense, as compared with last year.

Mr. Grant condemned inside trading allowances because of the upsetting effect they leave on the used car market. If factories give trading allowance three months of the year, he said, dealers wouldn't be expected to be pure in their used car trading the other nine months. In this connection, he said that respect for list prices had fallen to a very low level and restoration of confidence in the established price was one of the industry's important jobs.

Management will play the major role next year in determining whether a dealer makes money, in Mr. Grant's opinion. Some dealers will be assisted by having cars to sell which have outstanding public appeal. But inasmuch as it is uncertain as to which lines would enjoy this advantage, he urged dealers to depend on good management primarily to pull them through in 1932.

Trimming accounts and notes receivable is one of the most important dealer management problems. General Motors dealers, Mr. Grant stated, had two and one-half times as much invested in the outstanding accounts as in used cars. One-half of the total consists mostly of notes on used car deals while the other half is open accounts, 70 per cent of which are for labor and parts. Dealers in one General Motor division have $17,000,000 in outstanding repair bills which average $2.73 each. To restore these frozen assets to the dealer's working capital, he recommended study of retail credit practices.

Conferences between dealers and factories undertaken in a cooperative spirit also were recommended by Mr. Grant.

As no other form of transportation seems likely to displace the automobile, Mr. Grant views the long haul prospect of the industry with confidence. The outlook for the remainder of this year and for 1932 he regards as obscure. This year's domestic sales of passenger cars he predicted would amount only to about 1,700,000.

Childs to Visit Plants

WASHINGTON, Oct. 14—A. W. Childs, chief of the Commerce Department's automotive division, plans to leave Washington Oct. 19 for one of his periodic visits to motor vehicle and equipment manufacturers. A tentative schedule for the trip, which will take about two weeks, follows:

Chicago	Oct. 20
Kenosha	Oct. 20
Chicago	Oct. 20-21
South Bend	Oct. 22
Auburn	Oct. 22
Toledo	Oct. 23
Detroit	Oct. 23-24-25
Grand Rapids	Oct. 26
Lansing	Oct. 26
Detroit	Oct. 27-28-29
Cleveland	Oct. 30-31 and Nov. 1
New York	Nov. 2-5

Nash Declares Dividend

NEW YORK, Oct. 12—Nash Motors Co. has declared a dividend of 50 cents per share payable Nov. 2 to stockholders of record Oct. 20, thus placing the share on a $1.00 annual basis. The company reports earnings for the third quarter of the current year of $1,906,751. This compares with earnings for the previous quarter of $1,260,574.

The board of directors has elected N. E. Wahlberg, who has been an engineer with the company since its organization, vice-president in charge of engineering.

The number of stockholders as of Oct. 1 is reported at 22,178, representing a steady growth from March 31, 1925, when there were 1014.

Diamond T Steps Up

NEW YORK, Oct. 12—Diamond T Motor Co. reports a 35 per cent increase in sales and shipments for September, as compared with the same month last year. September was the fourth consecutive month to show a gain over the corresponding period last year, according to E. J. Bush, vice-president in charge of sales. It also represented the largest percentage of gain of any month, as compared with the preceding month for last year.

Timken Unit Expands

DETROIT, Oct. 14—The Timken-Detroit Co. and the Silent Automatic Corp., two dominant manufacturing establishments in the oil burning heating equipment field, will consolidate Jan. 1, it is announced here by officials of the two companies. The new concern will be known as the Timken Silent Automatic Co. The consolidation will make the Timken Silent Automatic Company the largest unit in the oil burner industry, it is claimed.

Mackinnon to Expand

OSHAWA, ONT., Oct. 12—General Motors of Canada, Ltd., announce that their Mackinnon Industries unit at St. Catharines, Ont., is about to embark on the manufacture of five new lines of automobile parts. The particular parts to be made, only one of which has been manufactured in Canada previously, are steering wheels, shock absorbers, ignition coils, AC spark plugs and axle shafts. The Mackinnon factory states that with motor trade at anything like normal in the coming year, this will mean employment for 200 to 250 additional men. Parts are to be made for Canadian cars other than General Motors cars, as well as for some of the General Motors lines. Most of the latter, manufactured at Oshawa, Ont., have long been above the percentage of Canadian-made content required by Federal fiscal regulations.

Curtiss Revises Operations

NEW YORK, Oct. 12 — Curtiss-Wright Flying Service has reorganized its operations in accord with the recently announced change of policy made by J. S. Allard, the new president.

Sales territories have been clarified and more clearly defined and the type of service rendered at its various bases has been broadened to encourage independent operators to make use of the terminal facilities and service work of the Flying Service. Sales territories have been reorganized under three clearly defined districts with a fourth covering certain specified air bases.

Casing Shipments Off

NEW YORK, Oct. 12—Shipments of tire casings during August amounted to 4,959,984, according to the Rubber Manufacturers' Association, Inc. This represents a decrease of 9.2 per cent under July and of 4.2 per cent under August, 1930. Production during the month is placed at 3,905,933 units, a decrease of 20.7 per cent, as compared with July, and of 6.2 per cent, as compared with August, 1930. Inventories as of August 31 are 8,896,296 units, a drop of 10.3 per cent under July 31, and of 18 per cent under August 31 of last year.

Develops New Engine

NEW YORK, Oct. 12—American Airplane & Engine Corp., Farmingdale, N. Y., has recently completed a new geared-supercharger, inverted - Vee, air-cooled engine. The engine has passed a 50-hour endurance test, developing 400 hp. at 1870 propeller r.p.m. Commercial rating is 340 hp. at 1700 propeller r.p.m.

Summary of General Motors' Sales for September and Preceding Months

Sales to Consumers in United States

	1931	1930	1929	1928
January	61,566	74,167	73,989	80,582
February	68,976	88,742	110,148	107,014
March	101,339	123,781	166,942	155,973
April	135,663	142,004	173,201	170,544
May	122,717	131,817	169,034	186,892
June	103,303	97,318	154,437	174,085
July	85,054	80,147	147,079	142,515
August	69,876	86,426	151,722	151,105
September	51,740	75,805	124,723	118,113
October	.....	57,757	114,408	109,789
November	.....	41,757	68,893	70,414
December	.....	57,989	44,216	25,434
Total	.....	1,057,710	1,498,792	1,492,461

Sales to Dealers in United States

	1931	1930	1929	1928
January	76,681	94,458	95,441	96,845
February	80,373	110,904	141,222	141,642
March	98,943	118,081	176,510	168,107
April	132,629	132,365	176,634	161,720
May	136,778	136,169	175,873	170,388
June	100,270	87,595	163,704	154,912
July	78,723	70,716	157,111	135,412
August	62,667	76,140	147,351	149,781
September	47,895	69,901	127,220	136,870
October	.....	22,924	98,559	91,428
November	.....	48,155	39,745	27,672
December	.....	68,252	36,482	27,779
Total	.....	1,035,660	1,535,852	1,462,556

Total Sales to Dealers in U. S. and Canada Plus Overseas Shipments

	1931	1930	1929	1928
January	89,349	106,509	127,580	125,181
February	96,003	126,196	175,148	169,232
March	119,195	135,930	220,391	197,821
April	154,252	150,661	227,718	197,597
May	153,730	147,483	220,277	207,325
June	111,668	97,440	200,754	186,160
July	87,449	79,976	189,428	169,473
August	70,078	85,610	168,185	186,653
September	58,122	78,792	146,483	167,460
October	.....	28,253	122,104	120,876
November	.....	57,257	60,977	47,587
December	.....	80,008	40,222	35,441
Total	.....	1,174,115	1,899,267	1,810,806

Unit sales of Chevrolet, Pontiac, Oldsmobile, Oakland, Buick, LaSalle and Cadillac passenger and commercial cars are included in the above figures.

Met. Section to Meet

NEW YORK, Oct. 14—The regular meeting of the metropolitan section of the Society of Automotive Engineers will be held on Thursday evening, Oct. 22, at the American Woman's Association Building.

The general theme of the meeting will be the adaptation of the passenger car for fleet purposes, particular stress being laid on the comparative desirability of owning or renting fleets of passenger cars, and the requirements of the car for fleet purposes as compared with the requirements of the car for private ownership.

John A. C. Warner, general manager of the Society, will also speak on the engineering problems in giving the public what it wants in individual transportation.

Form New Company

INDIANAPOLIS, Oct. 14—Formation of the Langsencamp-Linkert Carburetor Co. as a division of the Langsencamp-Wheeler Brass Works has been announced. Officers of the company have been elected as follows: H. W. Linkert, president; Henry Langsencamp, treasurer; S. R. Hawkins, vice-president in charge of sales; A. M. Lang, vice-president in charge of manufacturing, and Henry Langsencamp, Jr., secretary. Maldwyn Jones, formerly in charge of motorcycle carburetor engineering for the Wheeler-Schebler Corp., has joined the new organization. Mr. Linkert was formerly chief engineer of Wheeler-Schebler, and Mr. Hawkins was manager of replacement sales and service.

Opens Demonstrating Station on Lake

NEW YORK, Oct. 15—The Bobilin Boat Works, Fort Plain, N. Y., has just completed a branch demonstration station on the new Sacandaga Lake, where they have recently sold over 150 boats.

Hupp Shifts Operations

DETROIT, Oct. 14—Officials of the Hupp Motor Car Corp. have announced that all body manufacture for Hupmobile cars will be transferred to its Cleveland plant. The six-cylinder Hupmobile production which has been carried on since absorption of the Chandler Co. in the fall, 1928, is at the same time being moved to Detroit where all mechanical production will be concentrated. The necessary transfer of equipment will be carried on in the next thirty days, the new setup becoming effective Nov. 1. Production will be carried on during the process.

Overseas Club Meets

NEW YORK, Oct. 15—Foreign exchange and credit was the subject of the regular monthly meeting of the Overseas Automotive Club held at the Hotel Astor here today.

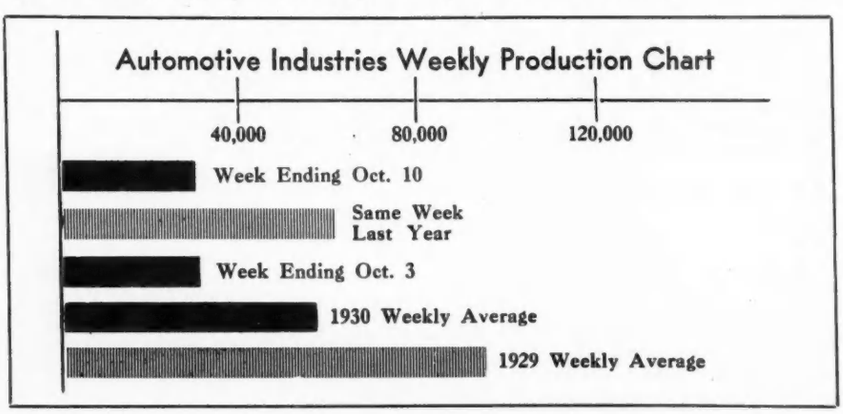
Glyn Davies of General Motors Acceptance Corp. was the principal speaker and discussed the foreign situation from numerous angles. The question was also raised as to the effect upon trade with the British Dominions, which would result from their reaction to the suspension of gold payments by England.

General Tire Declares

NEW YORK, Oct. 14—General Tire & Rubber Co. has declared regular quarterly dividend of $0.75 a share on common stock, payable Nov. 1 to stockholders of record Oct. 20. This is the 63rd consecutive dividend declared by the company since its organization.

N.A.C.C. Names Stettinius

NEW YORK, Oct. 14—E. R. Stettinius, vice-president of General Motors Corp. in charge of public and industrial relations, has been appointed to the Street Traffic Committee of the National Automobile Chamber of Commerce by Alvan Macauley, president of that body.



Supports Hoover Plan

DETROIT, Oct. 12—William J. McAneeny, president of the Hudson Motor Car Co., in a telegram to the company's 3000 distributors and dealers, said last week that "the Hudson Motor Car Co. enthusiastically supports President Hoover's finance proposal."

THE NEWS TRAILER

(Continued from page 623)

Citroen thought the people of his native city should be given a chance to see their beauties during the dark hours, and because the people of Paris, like those everywhere, are glad to accept improvements which do not come out of the municipal tax fund.

We read somewhere last week that the Empire State Building in New York is killing interest in the Eiffel Tower in Paris, because the Tower is no longer the tallest structure in the world. But any lost interest in the Eiffel Tower will not be for lack of visibility. M. Citroen has caused to be placed on the whole length of the tower an immense electric sign, which spreads the word Citroen perpendicularly for nearly a thousand feet. You can see it for 30 miles, says M. Citroen, and there are three changes of "copy."

You may be interested to know that the Mathis people in France are advertising that the car, which was brought to this country a year or more ago, has proved to be "the car that astonished America." Had you noticed?

The *New York World-Telegram* for Saturday, Oct. 10, carried an exciting yarn which brings some automobile history alive. It's headed "Bears' Cross Fire on General Motors Dislodges W. C. Durant," and juggles figures enough to make you dizzy. On July 27, 1920, the account says, the fireworks started when 100,000 shares of General Motors were dumped on an unwary market. From then on, W. C. D. lost staggering sums daily as the bears brought up the heavy artillery. Most significant is the fact that W. C. D. consistently refused to climb on the band wagon and go short for a profit. He wanted to save the company, so the story goes, and it cost him a maharajah's ransom to try. When the smoke rolled away (Mr. Durant is personally anti-tobacco), a fortune had been blotted out. In ten years another had succeeded it. Whoops. Read the story.

Things we have laughed at during the past week included a sign in a Washington taxicab, which reads exactly as follows: "Shut Up. Who the hell is driving this car anyway." Washington cab drivers are like that.

A second story comes from abroad (one word) and concerns one of the plants being built to produce automobiles in Soviet Russia. It seems that the plans for the plant were O.K.'d, construction proceeded at a record pace, the building was finished. It was all ready for the final inspection, in fact, when some master minds discovered that no provisions were made for heating it or ventilating. "You've got to give the Russians credit for one thing," says our informant, "when they discover they've made a mistake they go right ahead and correct it." Well, we should think they would.—HERBERT HOSKING.

Non-Sales Units Stage Successful Sales Effort

NEW YORK, Oct. 13—Employees of General Motors Acceptance Corp. and General Exchange Insurance Corp., who staged a sales campaign of General Motors products during September, succeeded in selling 2265 units to a value of $1,193,847. As a result of this campaign, in addition to actual sales consummated, there were 21,838 prospects turned in.

Believing that one good contest deserves another, these two units are staging another contest during the month of October, to be known as the "Sell Your Prospect" Campaign, during which they will endeavor to turn these 21,000 prospects into actual sales.

In this campaign, there will be one $50 prize and six $25 prizes for those gaining the most points in the contest, and the contestant in each branch who has the highest number of points will receive a special award from the president.

German Aircraft Companies Merge

BERLIN, Oct. 6 *(by mail)*—Negotiations between the Focke-Wulf Aircraft Co. of Bremen and the Albatros Airplane Co. of Berlin-Johannisthal have now led to both companies being merged under the leadership of the Bremen concern, the share capital of which has been raised by 85,000 marks (approximately $20,000) to 285,000 marks ($68,000).

Directors of N.A.C.C. Honor Citroen

NEW YORK, Oct. 15—Andre Citroen, president of the Citroen Motor Works of France, was to be the guest of honor at a luncheon given Friday, Oct. 16, by directors of the National Automobile Chamber of Commerce. Prominent executives of the American automobile and associated industries received invitations to the luncheon.

M. Citroen arrived in the United States on Tuesday, Oct. 13, to attend the eighth Conference of Major Industries which is being sponsored by the American Institute of Meat Packers and Columbia University.

Guests who were invited to the luncheon include:

Alvan Macauley, president, National Automobile Chamber of Commerce and president, Packard Motor Car Co.; Walter P. Chrysler, president, Chrysler Corp.; A. J. Brosseau, president, Mack Trucks, Inc.; Alfred P. Sloan, Jr., president, General Motors Corp.; Byron C. Foy, president, De Soto Motor Corp.; Donaldson Brown, vice-president, General Motors Corp.; John J. Schumann, Jr., president, General Motors Acceptance Corp.

W. C. Durant, president, Durant Motors, Inc.; Alfred Reeves, general manager, National Automobile Chamber of Commerce; Edwin A. C. Vogel, chairman, Commercial Investment Trust Co.; George W. Davidson, president, Central-Hanover Bank & Trust Co. and director of the American Bankers Assn.; William L. Colt, president, Automobile Merchants Assn. of New York; Vincent Bendix, president, Society of Automotive Engineers and president, Bendix Aviation Corp.; E. T. Satchell, president, Motor & Equipment Wholesalers Assn.; Herbert R. Pratt, chairman, Standard Oil Co. of New York and director of the American Petroleum Institute.

Charles M. Schwab, president, American Iron and Steel Institute and chairman, Bethlehem Steel Corp.; J. D. Tew, president, Rubber Manufacturers Assn. and president, Goodrich Rubber Co.; E. R. Frederick, American Representative of M. Citroen; Dave Hennen Morris, chairman, Foreign Relations Committee, Automobile Club of America; George L. Brunner, president, Motor & Equipment Manufacturers Assn., and president Brunner Manufacturing Co.

Charles B. Warren, National Automobile Dealers Assn. and president, Warren-Nash Motor Corp.; Owen B. Augspurger, vice-president, American Automobile Assn.; C. A. Musselman, president, The Chilton Class Journal Co.; Frank Roche, publisher, *Automobile Topics;* Alexander Johnston, editor, *Automotive Daily News;* Ray Sherman, *Motor.*

Autocar Gets Navy Order

ARDMORE, PA., Oct. 15—The Autocar Co. has been awarded an order for 21 heavy-duty chassis by the United States Navy Department.

Canadian Vehicle Registrations and Revenue for 1930

	Registrations			Revenue	
	Cars	Trucks	Total	From Registration	From Gas Tax
P. E. Island.....	6,611	719	7,402	$ 145,994	$ 140,853
Nova Scotia	36,078	6,958	43,036	1,052,480	851,725
New Brunswick ...	30,318	4,515	34,833	876,987	659,797
Quebec	140,802	38,174	178,976	5,298,217	4,075,368
Ontario	491,007	73,663	564,669	5,566,200	10,756,836
Manitoba	68,550	11,258	79,308	1,079,894	1,099,778
Saskatchewan	108,161	21,700	129,861	1,954,549	1,538,556
Alberta	85,067	17,585	102,652	2,014,927	1,939,048
British Columbia ..	80,766	18,177	98,943	2,167,124	1,605,751
Yukon Territory ..	134	75	209	2,400	.....
Canada, total, 1930.	1,047,494	192,495	1,239,889	$20,158,772	$22,667,712

Steel Mills Jump Operating Rate

Indications Point to Larger Orders From Automotive Consumers

NEW YORK, Oct. 15—The rate at which Mahoning Valley finishing mills are operating this week is accepted as proof that orders for sizable tonnages of steel sheets have been placed by low-price passenger motor car manufacturers and parts makers. In some plants an operating rate of 40 per cent of capacity has been attained, denoting an improvement of approximately 25 per cent over the low point. Michigan mills are also reported to have been able to step up operations.

Strip mills, which have been down to as low as 20 per cent of capacity, are getting back to a more satisfactory rate of operations. Mild betterment in the demand for cold-finished and alloy steel bars is also noted. A sort of armistice on prices seems to be in effect for the time being, at least insofar as concerns base prices. The leading interest's unfilled tonnage statement, showing a backlog of 3,144,833 tons on Sept. 30, is generally accepted as denoting the low for the year, the rate at which orders are being booked this month giving every assurance that a moderate upturn will be recorded at the end of this month.

With reference to the railroads' plea for increased freight rates, the steel industry is in a dual mood. As raw materials consumers and shippers, producers hardly relish an increase in freight rates while, as sellers of rails and other descriptions of steel to the carriers, they feel that buying by the railroads depends upon their obtaining more revenue than at present.

Pig Iron—A number of automotive foundries are reported to be inquiring for round lots, with others still confining their purchases to one or two carloads for immediate shipment. Prices are quotably unchanged, the markets generally being easy in tone.

Aluminum—Middle West automotive foundries are taking in somewhat more metal. The market for secondary metal is easy.

Copper—Market gossip has it that, if producers succeed at all in having copper added to the list of dutiable metals, it will be at the rate of 4 cents a pound. While sentiment is more cheerful, the market is marking time pending the result of the proposed curtailment of production conference of the leading marketers.

Tin—The International Tin Pool is believed to be extending support to the London market. Firmness there caused a more steady tone here, Straits tin opening the week at 23⅛ cents.

Lead—Quiet and unchanged.

Zinc—Dull and steady.

Completes English Plant

NEW YORK, Oct. 12—Kelsey-Hayes Wheel Corp. has completed the first unit of its English plant in Dagenham and is now in production on wheels for the European market. This plant is intended to care for business not only in England but for all of the European countries.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

Olympia Passenger Car Show, London	Oct. 15-24
Olympia Truck Show, London	Nov. 5-14
Passenger Car Show, Glasgow	Nov. 13-21
Salon, New York City	Nov. 29-Dec. 5
Motorcycle Show, London	Nov. 30-Dec. 5
National Automobile, New York	Jan. 9-16
San Francisco, Automobile	Jan. 16-23
Newark, N. J., Automobile	Jan. 16-23
Cincinnati, Automobile	Jan. 17-23
Philadelphia, Automobile	Jan. 18-23
Louisville, Ky., Automobile	Jan. 18-23
Boston, Mass., Automobile	Jan. 23-30
Minneapolis, Minn., Automobile	Jan. 23-30
Hartford, Conn., Automobile	Jan. 23-30
Detroit, Automobile	Jan. 23-30
Montreal, Automobile	Jan. 23-30
Baltimore, Automobile	Jan. 23-30
Pittsburgh, Pa., Automobile	Jan. 23-30
National Automobile, Chicago	Jan. 30-Feb. 6
Salon, Chicago	Jan. 30-Feb. 6
Washington, D. C., Automobile	Jan. 30-Feb. 6
Cleveland, Automobile	Jan. 30-Feb. 6
Springfield, Ill., Automobile	Feb. 4-6
St. Louis, Automobile	Feb. 7-12
Kansas City, Automobile	Feb. 7-14
Denver, Colo., Automobile	Feb. 8-13
Peoria, Ill., Automobile	Feb. 9-14
Salon, Los Angeles, Calif.	Feb. 13-20
Mankato, Minn., Automobile	Feb. 17-20
Holyoke, Mass., Automobile	Feb. 18-22
Des Moines, Ia., Automobile	Feb. 21-26
Wichita, Kans., Tractor and Power Equipment	Feb. 23-26
Salon, San Francisco, Calif.	Feb. 27-Mar. 5

CONVENTIONS

American Gear Mfg. Assn., Pittsburgh	Oct. 15-17
Associated Business Papers, Chicago, Ill.	Oct. 19-21
National Hardware Assn., Chicago,	Oct. 19-22
American Iron and Steel Institute, New York City	Oct. 23
American Railway Assn.—Motor Transport Division, Chicago	Oct. 27-28
Transportation Meeting, S.A.E., Washington, D. C.	Oct. 27-29
National Association of Finance Companies, Chicago	Nov. 17-18
American Society Mechanical Engineers—Annual meeting, New York City	Nov. 30-Dec. 4
American Roadbuilders Association, Detroit, Mich.	Jan. 11-14, 1932
S.A.E. Annual Dinner, New York City,	Jan. 14
S.A.E. Annual Meeting, Detroit, Mich.,	Jan. 25-29

S.A.E. LOCAL MEETINGS

Milwaukee	Oct. 8
Kansas City	Oct. 9
Cleveland	Oct. 12
Chicago	Oct. 13
Philadelphia	Oct. 14
Indiana (Indianapolis)	Oct. 15
Canadian (Toronto)	Oct. 21
New York (Metropolitan)	Oct. 22
Baltimore	Oct. 27-29
Washington, D. C.	Oct. 27-29

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Oct. 14—There was a slight improvement in commodity markets last week. General business, however, showed no material improvement. The weather was too warm for the retail movement of seasonal lines, and wholesalers and jobbers were confined to business in small lots.

COMMERCIAL FAILURES

Commercial failures during September, according to R. G. Dun & Co., totaled 1936, as against 1944 during the preceding month and 1963 a year ago. The liabilities involved in the September failures totaled $40,255,260, as against $53,025,132 in the preceding month and $46,947,021 a year ago.

CARLOAD SHIPPING

Carload shipments of 29 principal commodities in the fourth quarter of this year, according to the Shippers' Regional Advisory Boards, will approximate 6,153,250 cars, which marks a decrease of 7.6 per cent below those a year ago.

CAR LOADINGS

Railway freight loadings during the week ended September 26 totaled 738,029 cars, which marks a decrease of 4599 cars below those during the preceding week, a decrease of 212,634 cars below those a year ago, and a decrease of 465,110 cars below those two years ago.

FARM PRICE INDEX

The index of prices paid to farmers for farm products on September 15 reached a new low at 72, as against 75 a month earlier and 111 a year earlier.

CRUDE OIL OUTPUT

Average daily crude oil production during the week ended October 3 amounted to 2,147,450 barrels, as against 2,193,350 barrels for the preceding week and 2,386,950 barrels a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended October 10 stood at 68.1, as against 68.1 the week before and 68.6 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended October 7 were 11 per cent below those a year ago.

STOCK MARKET

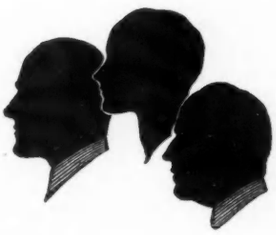
The stock market during the earlier part of last week showed continued weakness, with United States Steel reaching the lowest level since 1915. Many other low records were also made. President Hoover's proposal to form a pool among the banks of the country for an amount not less than $500,000,000 for the purpose of liberating frozen assets of the smaller banks was received favorably. During the latter part of the week stocks advanced rapidly, and net gains for that period were general.

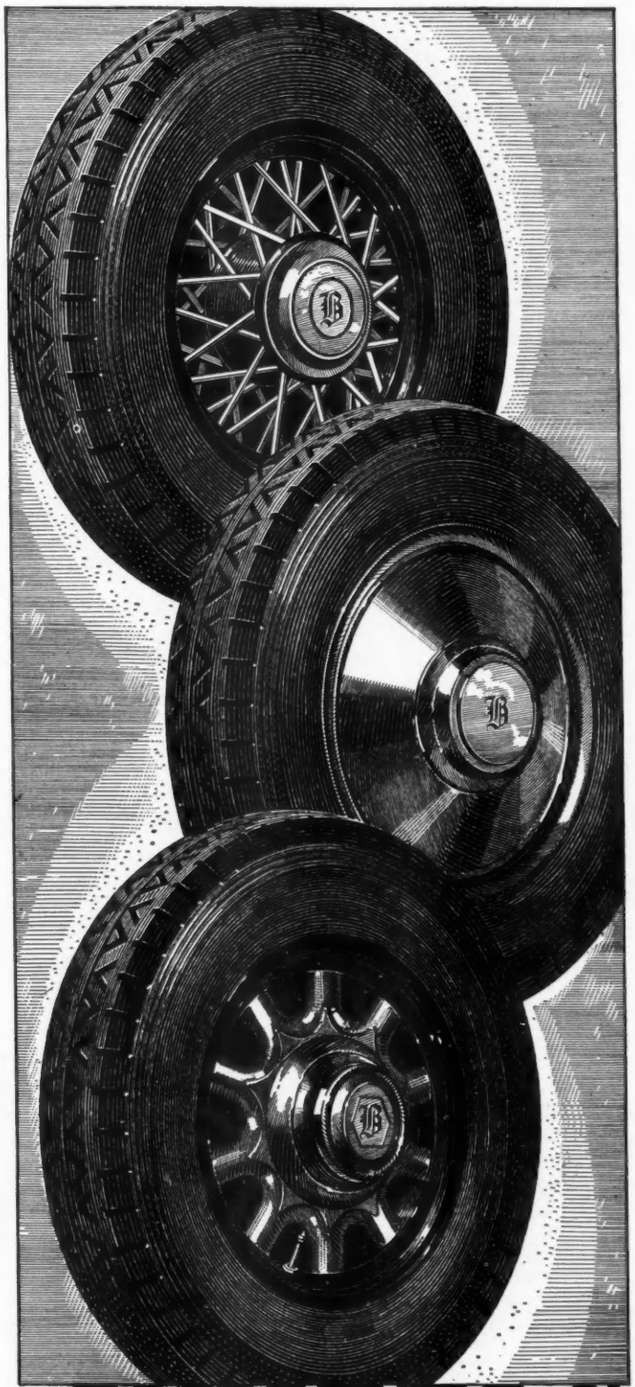
BROKERS' LOANS

Brokers' loans in New York City during the week ended Oct. 7 decreased $171,000,000. The total of these loans on Oct. 7 was about $2,000,000,000 below that a year ago.

RESERVE STATEMENT

The Federal Reserve Bank of New York increased its rediscount rate from 1½ to 2½ per cent last week. The consolidated statement of the Federal Reserve banks for the week ended Oct. 7 showed increases of $35,000,000 in holdings of discounted bills and of $112,000,000 in holdings of bills bought in the open market. Holdings of Government securities decreased $4,000,000. The reserve ratio on Oct. 7 was 67.1 per cent, as against 71.7 per cent a week earlier and 77.0 per cent two weeks earlier.





These motorists have been pleased . . . . .

To-day, most motorists prefer wire wheels. They have been glad to know that they are made of steel—the safest and most satisfactory of all wheel materials.

So have these . . . .

Some motorists like the disc wheel. They, too, have been pleased that the wheel they prefer is made of steel.

Now these are too!

Some still favor the artillery type and have taken it even though it has been available only in wood. Now these motorists, too, can have their favorite type of wheel in steel. Budd, in perfecting the Budd-Michelin Steel Artillery Wheel, offers a steel wheel to meet every preference—and brings the day closer when all cars will ride on wheels of steel!

BUDD WHEEL COMPANY
DETROIT PHILADELPHIA

P. S. All types of Budd-Michelin Wheels are interchangeable on the same hub.

★WHEELS BY BUDD★

What Has Gone Before

(Continued from page 621)

Firth Hardometer

The Firth Hardometer, which is being sold in this country by Tinius Olsen Testing Machine Co., Philadelphia, operates on the standard Brinell principle but uses lighter loads and either a small steel ball or a diamond pyramid as an indenter.

The small steel ball is used on thin or soft materials. The diamond pyramid is used on the hardest material, and the instrument is adaptable for use on case-hardened, cyanided and nitrided surfaces. (July 25, page 147.)

Tabor Molding Machine

A Tabor Jar, Rollover and Pattern Draw Molding Machine has been placed on the market by the Tabor Manufacturing Co., Philadelphia, Pa. The machine has an effective long-stroke jarring blow and requires a minimum of time for the ramming of molds. The rollover mechanism is oil controlled, thus being absolutely safe while operating at high speed. (July 25, page 147.)

Barber-Colman Unit for Indicator

Barber-Colman Co., Rockford, Ill., announces a new unit called the Indicator Finger, which is designed for getting at many places that cannot be reached by a regular indicator. (July 25, page 147.)

Howell Adds Fractional Line

Howell Electric Motors Co., Howell, Mich., has added a new line of fractional horsepower motors, Type CI, from 1/10 to 1/3 hp. capacity. This line consists of condenser start, split phase and polyphase motors, all built in a frame with the same mechanical dimensions. (July 25, page 147.)

Semi-Automatic Spindle

Recently the Krueger Division of Ex-Cell-O Aircraft Tool Co. was called upon to design a multiple tapping machine for tapping work while submerged. Twenty-one full adjustable spindles were provided on the machine, with a minimum center distance of 7/16 in., and the spindles were designed for drilling or tapping holes not to exceed 1/4 in. diameter. (July 25, page 148.)

Mikrotast Ball Gage

Gaging balls is said to be greatly facilitated by the Mikrotast gage recently placed on the market by the Coats Machine Tool Co., New York, N. Y.

The gage obviates the necessity for picking up the steel balls. In a chute or trough the balls are guided toward the plate, are straddled with the gage and, after gaging, are directed into any given number of exit channels. (July 25, page 150.)

Sundstrand Super-Sensitive Balance

The Sundstrand Machine Tool Co., Rockford, Ill., has added to its line of balancing tools a super-sensitive tool for balancing light parts such as aluminum fans, motor armatures, etc. The manufacturer claims that the tool is so sensitive that a 1½-lb. disk can be thrown out of balance with a 5-grain weight on a 3-in. radius. (Aug. 22, page 302.)

Ingersoll-Rand Multi-Vane Grinder

Another "Multi-Vane" type grinder and sander, size 4F, has been added to the Ingersoll-Rand line. This is a lightweight, high-production machine for grinding, sanding, polishing and wire brushing operations. The standard free speed is 4600 r.p.m., but units can be furnished for higher or lower speeds. Overspeed is prevented by a governor. (Aug. 22, page 302.)

Ludlow Multi-Valve

Multi-Stage reduction of pressure and tight closure for air, steam, gas, water and viscous liquids are said to be afforded by the Ludlow Multi-Valve, made by the Ludlow Valve Mfg. Co., Troy, N. Y. (Aug. 22, page 302.)

Improvements in Power Presses

Improvements in the design of power presses built by the Farrel-Birmingham Co., Inc., Ansonia, Conn., are now available. This line now includes anti-friction bearings as standard equipment for the driveshaft of all geared presses. (Aug. 15, page 266.)

Nut Tapping Attachment

A nut tapping attachment for B&S screw machines has been announced by the Brown & Sharpe Mfg. Co., Providence, R. I. It is made in three sizes for use on the Nos. 00, 0 and 2 machines, both the regular and high-speed types; also on the screw-threading machines. It is of the second operation type and is fastened to the machine above the front cross slide. (Aug. 15, page 266.)

Variable Delivery Pumps

Two high-pressure, one-way variable delivery pumps have been added by the Oilgear Co., Milwaukee, Wis. Type QR-2 is designed for use where it is essential to have a smooth and positive straight-line motion. The type QWR-2 has the additional feature of constant and variable pressure control. It is recommended for use where it is necessary or desirable to hold the work under a predetermined pressure for a period of time.

General specifications are the same for both units. Maximum pressure, 1500 lb. per sq. in.; maximum speed, 860 r.p.m.; weight without oil casing as shown, 375 lb. net.

This company is also building two new pumps having a maximum working pressure of 2500 lb. per sq. in. (Aug. 15, page 264.)

Multiple Spindle Drill

A new heavy-duty machine for mulmultiple-spindle drilling or boring operations has been developed by the Rockford Drilling Machine Co., Rockford, Ill. It provides the advantages of low-cost high production usually secured only with single-purpose equipment, but incorporating a flexibility adapting it to many jobs. (Aug. 15, page 264.)

Nathan Mechanical Lubricators

Mechanical lubricators have been adapted for industrial applications and are offered to the industry by the Nathan Mfg. Co., New York, N. Y. These units are recommended by the maker for all types of machine tools and other equipment. Positive delivery of measured quantities of oil is assured wherever lubrication is needed, it can be fed against any pressure from zero to 500 lb. per sq. in.—higher when required. (Aug. 8, page 228.)

Clark Lifting Type Truck

A lifting type power truck with four-wheel steer and rear-wheel drive, on which the steering wheels can be turned to a sharp angle enabling the operator to enter a freight car and spot his load at the far end, has been placed on the market by the Clark Tructractor Co., Battle Creek, Mich. (Aug. 8, page 228.)

Niagara No. 512 Press

A large single-crank press of new design equipped with a special two increment roll feed has been placed on the market by the Niagara Machine & Tool Works, Buffalo, N. Y. (Aug. 15, page 266.)

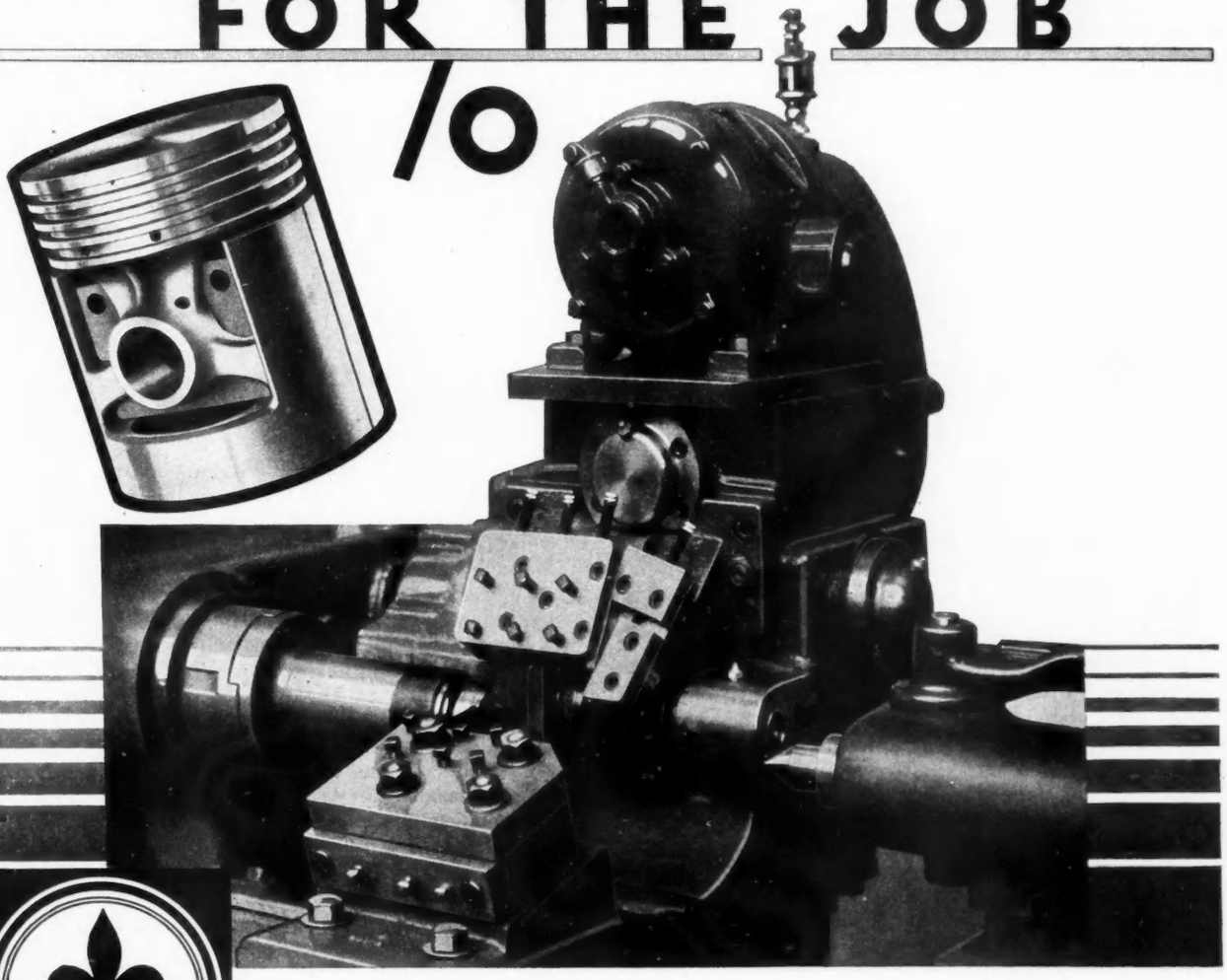
Hammond Multi-V Belt Drive

A variable speed pulley capable of transmitting up to 15 hp. capacity has been placed on the market by the Hammond Machinery Builders, Kalamazoo, Mich.

One advantage of this Multi-V pulley is that it can be used with the popular V-belt. It takes up very little additional room over that of the ordinary V-belt pulley. (October 3, page 516.)

(*Turn to page 632, please*)

100% FOR THE JOB



ECONOMICAL operation—and profit—result from using tools especially designed for the work to be done. Take, for instance, the machine shown here. It is 100% for the job.

It is a No. 9 Multi-cut Lathe to turn, face and groove pistons. Special head to mill slots actuated by separate motor facing tool on rear slide operated by rack and pinion from the movement of the carriage.

Because this lathe has been built for a special purpose, it is above the competition of the general purpose machine, yet it may be profitably used for other jobs as well.

After designing unusual mechanism for over forty years, it has become every-day experience with LeBlond engineers. If you have a production problem, a consultation would prove profitable.

THE R. K. LeBLOND MACHINE TOOL CO.

CINCINNATI, OHIO, U. S. A.

"Liquilox" Protective Coating

"Liquilox," a new liquid protective coating, has been introduced to the trade by the Liquilox Company, Ltd., Los Angeles, Calif. According to the manufacturers it is a protection against acids, alkalies, etc. "Liquilox" may be applied with either gun or brush to hot or cold surfaces. (September 12, page 418.)

General Screw Cutting Lathe

The General Radial Drill Co., Cincinnati, Ohio, has placed on the market a new Model "B" Screw Cutting Lathe, which is especially adaptable to automotive service work. The swing is 11 in., and is made in 4-ft., 5-ft. and 5½-ft. lengths of bed.

This new unit incorporates the Gibbs V-Disk Drive, which runs as an idler between the driving and the driven cones. Model "B" has a thread range of from 8 to 224 threads per inch.

The spindle is hollow for long work. The compound has 2¼ in. travel and may be adjusted to any degree angle. The cross slide has 6½ in. travel. Carriage, bottom and top slides have gibs which are adjustable to wear. (September 12, page 418.)

"Cee-Bee" Cleaning Compounds

A new product important to users of cleaning compounds was recently announced by the Cee-Bee Laboratories, Ltd., Los Angeles, Calif. According to the manufacturers, "Cee-Bee Cleaning Compounds Supreme" by analysis are found to contain no acidic preparations or other harmful ingredients that are dangerous to man or product. (September 12, page 418.)

The Lundberg "Handihold"

Lundberg Mfg. Co., Detroit, Mich., has introduced an interesting simple tool called the "Handihold." It can be used for a variety of purposes such as picking up and inserting in place such parts as small screws, washers, balls for ball bearings, locking pins, nuts, rivets, cotter pins, etc. (October 3, page 516.)

Weaver Universal Machine

The Model UM-2 Combination Universal Machine Tool has been placed on the market by H. A. Weaver, Detroit, Mich. It is designed for any mechanical workshop, repairshop, on board ships, aircraft plants, hangars and garages. Its dimensions are chosen to make possible the refinishing of any normal crankshaft and the regrinding of any normal cylinder. Further, the machine can be mounted on a truck for field work. (October 3, page 516.)

W-H Industrial Truck

The RT series 9-in. lift truck is offered by the Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y., for use in connection with the handling of skids of various underneath clearances. A truck can be obtained which will readily go under the lowest skid, and this same truck can be utilized for much higher skids also, as sufficient lift is available to allow ample clearance. (October 3, page 516.)

Obsolete Plant Gradually Ceases to Produce Profits

(Continued from page 594)

the present depression is that the above method of buying equipment can only be described as anarchy, and the equipment industry can never be stabilized so long as equipment buyers run wild in this manner. And, here again, the existing policy represents topsy-turvydom, for the peak of a boom is exactly the wrong time to buy equipment, to expand a factory, to create excess capacity, while at the extreme of a depression equipment can be bought to the best advantage, made from the best materials and workmanship, accompanied by the best of service, all at the lowest prices. Those who may try to laugh this thought to scorn should remember that Andrew Carnegie is reported to have followed this policy, and its operations are such that when he sold out to the newly formed steel corporation he made a very attractive bargain. The entire steel industry is reported to continue adhering to this policy as circumstances justify, and as a consequence it will be found that the steel industry and those who furnish it equipment are in a healthier position than many other branches of American industry.

There also appears to be an unbridged gap between the accounting policy and the equipment policy. The records of the typical enterprise will set up blank per cent for "depreciation and obsolescence." This statement in itself implies that somewhere there is a reserve for the above purposes, but try to find it. In how many instances have the funds so established been used to pay dividends or meet some business emergency? Where is the treasurer who considers that the funds represented by this item are held in trust for plant replacement to be expended at the discretion of the shop superintendent, and yet, on what other basis can management maintain the integrity of the capital investment of the enterprise? It is so easy through the opposite policy to unconsciously liquidate the assets, and it requires so much effort in hot weather, or in the midst of a storm of business problems to insure the life of the enterprise by maintaining the integrity of its investments in production equipment. And yet, very, very frequently the opposite policy is disastrous, as is well known, for it leads on to a vicious circle. The company with the obsolete plant gradually ceases to produce profits, then a point is reached where it cannot raise the capital required to rehabilitate the plant because it is not showing the profits. Many of the problems now confronted by various trade associations arise from this very condition, because some of the members caught in the vortex of this vicious circle simply cannot adopt healthy policies because they cannot escape this whirlpool.

Obsolescence and progress go hand in hand. The industry which shows no profits has no threat of obsolescence. The more rapid the progress the more important it is to insure against the hazards of obsolescence. In the metal working industries the development of cemented tungsten-carbide and similar materials is creating a series of problems of outstanding importance. There is a possibility that machine tools will be found obsolete inside of five years instead of the 10 to 50 years sometimes considered in connection with other discussions. Management faces a very difficult problem when it endeavors to maintain the integrity of its investments in metal working machinery. In many other industries progress through obsolescence is destroying plant investments far more rapidly than would be indicated by simple depreciation. Since it is obviously essential that our industries be kept in the very forefront of progress, it is similarly necessary that they be protected from the consequences of that progress, and this is the year when such matters have become peculiarly important. This is also the year when it is necessary to revise our habits with regard to plant expansion—rehabilitate during depression—avoid expansion during a boom.